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ABSTRACT

This publication provides abstracts of 32 active and 18 completed projects designed to improve pediatric emergency care. These projects are funded by the U.S. Department of Health and Human Services' Maternal and Child Health Bureau, in collaboration with the U.S. Department of Transportation's National Highway Traffic Safety Administration. Issues addressed by these projects include the entire continuum of pediatric emergency care, from injury prevention and emergency medical services access through prehospital and emergency department care, intensive care, rehabilitation, and reintegration into the community. The abstracts of active projects are organized into three categories: implementation and demonstration projects, targeted issues grants, and resource centers. Each abstract for both active and completed projects contains: (1) the name, location, director, and grant number; (2) the problem addressed; (3) goals and objectives; (4) methodology; (5) evaluation; and (6) experience to date. (MDM)

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Emergency Medical Services for Children

Abstracts of Active Projects FY 1994

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Emergency Medical Services for Children Abstracts of Active Projects FY 1994

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National Center for Education in Maternal and Child Health
Arlington, VA

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PREFACE

This publication documents the scope of efforts to improve pediatric emergency care in States that have received funding for emergency medical services for children (EMSC). These projects are funded by the U.S. Department of Health and Human Services, Public Health Service, Maternal and Child Health Bureau, in collaboration with the U.S. Department of Transportation, National Highway Traffic Safety Administration. The projects described in this publication cover a wide spectrum of geographic, organizational, and program resources and conditions, and offer a range of models for replication or modification by other States and localities. Each project is unique, addressing EMSC issues differently, and using a variety of resources and personnel.

The need to integrate pediatric emergency care into emergency medical services for children was indicated by research in the late 1970s showing that the mortality and morbidity in emergency care systems was higher for children than for adults. When children had access to a higher level of care, mortality and morbidity decreased. The importance of EMSC was summarized in 1993 in the Institute of Medicine report entitled *Emergency Medical Services for Children*. This report also recommends continued support for improvement in pediatric emergency care.

EMSC projects have been funded since 1985. The earliest projects provided demonstration models for integrating emergency medical services into existing emergency medical services (EMS) systems. Later projects implemented and expanded many of the earlier models. For several years, funding has been made available for Targeted Issues grants to explore various aspects of pediatric emergency care or to implement specific programs. To provide information about EMSC nationally, grants have been awarded since 1991 for the establishment of resource centers; to date, these centers include the National EMSC Resource Alliance in Torrance, California, and the EMSC National Resource Center in Washington, DC. The purpose of these centers is to organize and disseminate information about current and previous projects and grant products, to provide technical assistance in EMSC, and to assist new grantees in implementing programs and in building coalitions with private, public, and volunteer organizations.

To prevent duplication of effort and maximize resources, the transfer of knowledge gained in implementing Emergency Medical Services for Children has always been an important concern. EMSC projects are consistently encouraged to share information, to network with other States and localities, and to develop regional systems. Developing strategies for generating and maintaining State and local support for Emergency Medical Services for Children has become as essential activity; coalition building in the local community and at State and national levels assures ongoing interest and support of EMSC. Continuation of several EMSC projects after completion of grant funding has also been assured in several States through legislation.

Issues addressed by the EMSC projects include the entire continuum of pediatric emergency care, from injury prevention and EMS access through prehospital and emergency department care, intensive care, rehabilitation, and reintegration into the community. Pediatric components such as injury prevention, training, and transport and transfer protocols have been integrated into EMS systems in States receiving EMSC funding. The following elements are listed in EMSC program guidelines developed by the Maternal and Child Health Bureau:

Access to Care
Communication
Consumer Participation
Coordinated Recordkeeping
Critical Care Units
Facilities
Financial Resources
Mutual Aid
Patient Transfer
Personnel
Planning
Public Education
Public Information
Public Safety Agencies
Review and Evaluation
Training
Transportation

In fiscal year 1994, EMSC abstracts are organized into the three EMSC grant categories: Implementation/ Demonstration Projects, Targeted Issues Grants, and Resource Centers. In addition, projects cofunded with the National Institute of Mental Health are identified separately. The appendix includes previously funded projects. The EMSC projects in this publication represent only a small segment of the more than 800 active projects supported by the Maternal and Child Health Bureau in all areas of maternal and child health.

IMPLEMENTATION/DEMONSTRATION GRANTS

Arizona Emergency Medical Services for Children
University of Arizona
College of Medicine
Arizona Emergency Medicine Research Center
1501 North Campbell
Tucson, AZ 85724
(602) 626-6312

EMSC
MCH-044001
10/01/92-09/30/94
Project Director(s):
Daniel W. Spaite, M.D.

PROBLEM: Arizona has extremely high mortality rates from trauma and unintentional injury, and one of the highest drowning rates in the country. In 1992, drownings became the second leading killer of children in the State (second only to motor vehicle-related deaths). Because children are especially vulnerable to these problems, the need to improve pediatric emergency medical care and injury prevention is of tremendous importance. Initial training and continuing education programs in emergency medical services for children (EMSC) have been virtually inaccessible for emergency medical services (EMS) personnel in rural Arizona, and childhood injury prevention programs are also inadequate in the State's rural areas. This is partly attributable to the enormous geographic barriers that impede delivery and improvement of EMSC education and childhood injury prevention programs within the State. This project targets the large population of Hispanics and Native Americans in rural Arizona communities and in Indian Health Service units throughout Arizona and western New Mexico.

GOALS AND OBJECTIVES: The project's four main goals are to provide the following:

1. Broad-based training and education in prehospital and early hospital emergency medical care of children throughout Arizona and in western New Mexico;
2. Broad-based injury prevention education and training to emergency medical services personnel to develop community-based prevention programs emphasizing child restraints, seatbelts, bicycle helmets, bicycle safety, and drowning prevention;
3. Evaluation of the effect of EMSC training and injury prevention programs on specific outcomes in target areas; and
4. Continued and expanded statewide EMSC education and injury prevention programs through future grants.

METHODOLOGY: Nurse health educators will continue to provide broad training and education to prehospital and early hospital medical personnel caring for pediatric emergencies, using a modified North Carolina EMSC curriculum, together with portions of EMSC curriculums from Washington, Utah, and New Mexico. Injury prevention programs will be extended to as many rural communities as possible by (1) continuing the subcontract with Tucson Fire Department Childhood Injury Prevention Programs, (2) modeling "satellite" SAFE KIDS Coalitions in rural communities after the Tucson SAFE KIDS program, and (3) using the expertise and resources of the Governor's Office of Highway Safety.

Our project has established the following procedures to ensure coordination. Our educational programs are coordinated through area EMS provider agencies and hospitals, or directly with the Indian Health Service units where applicable. We are negotiating with one of these units to assign a nurse liaison to the project. The nurse liaison will provide direct input into continuing medical education and delivery of emergency medical services for children to the local Indian Health Service area. The Pediatric Advanced Life Support (PALS) component of our project will be coordinated primarily through area health education centers throughout the State. Our injury prevention programs are coordinated with the Governor's Office of

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Highway Safety, the Tucson and Arizona SAFE KIDS Coalitions, and community groups. All project activities are in harmony with the Arizona State Emergency Medical Services Office, overseen by Dr. Patricia Hastings, one of this project's coinvestigators.

EVALUATION: All project activities are kept on a master schedule. Project personnel meet bimonthly to discuss progress and problems, and additional meetings are held as required.

EXPERIENCE TO DATE: Overall, the Arizona Emergency Medical Services for Children project has made excellent progress. Project personnel and coalition groups have participated in (or have scheduled) 200 educational presentations, 50 injury prevention programs, and 6 PALS courses, involving 100 EMS agencies, 1,000 emergency health care providers, 10,000 children, and 200 parents. Project investigators have conducted workshops at national conferences on injury control and are members of key advisory committees that impact emergency medical services for children. Plans are underway to apply for additional grants to continue and expand EMSC education and prevention efforts.

Colorado EMS for Children Grant
Colorado Department of Health
Emergency Medical Services Division
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(303) 692-2980
(303) 782-0904 fax

EMSC
MCH-084001
10/01/92–09/30/94
Project Director(s):
Michael Armacost

PROBLEM: The State of Colorado is faced with many challenges in developing a systems approach to pediatric prehospital care. Currently, there are no specialized pediatric training programs available for prehospital care providers; this is especially true in rural Colorado. Children of minority and Native American populations are underserved by the emergency medical services (EMS) system. Intentional and unintentional injuries are the leading causes of death and disability among children in Colorado. No injury prevention program is presently available for prehospital providers interested in decreasing pediatric injuries.

GOALS AND OBJECTIVES: The Pediatric Emergency Care Committee of the Colorado Department of Health, Emergency Medical Services Division, has a mission to reduce childhood morbidity and mortality by establishing a system of emergency medical services for children (EMSC) in Colorado.

The following goals represent specific target areas within the overall objectives of the Pediatric Emergency Care Committee:

1. Implement a pediatric emergency training program throughout Colorado, with emphasis on rural EMS agencies. Rural prehospital and hospital providers will be offered initial and continuing training in recognizing and stabilizing the seriously ill or injured child.
2. Establish a statewide network of emergency medical technicians (EMTs) to conduct community-based injury prevention, education, and public awareness efforts. Local EMT agencies will be provided with resources to identify community needs in pediatric injury prevention, form injury prevention coalitions, and develop and disseminate intervention strategies.
3. Host a meeting of the Intermountain Regional EMSC Coordinating Council in Colorado in 1994 to assure that States in the region continue to network and share resources.

METHODOLOGY: The project is carrying out the following activities:

1. Pediatric Emergency Training:
   a. Computer-driven interactive videodisc technology, used by these EMSC projects, will be disseminated to rural transport agencies. The Pediatric Respiratory Emergencies software program will be offered during the first year, supplemented concurrently by pediatric skills training in basic life support, patient assessment, and airway management. Interactive videodiscs on pediatric trauma and on medical emergencies will be disseminated as they become available.
   b. The 2-day Pediatric Prehospital Care course for EMTs and paramedics, adopted from the Oregon/Washington/Utah EMSC course, will be offered to State training programs.
   c. A Pediatric Vascular Access course, developed by Utah EMSC, will be offered to all intermediate-level EMTs for both initial and continuing education.
   d. Nurses providing emergency care will be targeted through a pediatric emergencies course and/or a home study guide being developed by EMSC projects in other States.

2. Injury prevention:
   a. An EMT-based Injury Prevention Program will be established. EMSC staff will locate national resource materials on injury prevention that are appropriate to Colorado.
   b. An injury prevention/public information officer program will be developed. The injury prevention officer within each participating EMS agency will serve as the contact point to assist in forming SAFE KIDS coalitions, developing child car seat loaner programs, and working with the Department of Transportation and community leaders to help eliminate preventable morbidity and mortality among children.
   c. Minority children, specifically Native Americans and children with special health needs, will be targeted for direct technical assistance in injury prevention. The Utah EMSC product, *Two Worlds: A Calendar and Health Guide for Parents*, will be adapted for and distributed to the Colorado Indian population.
3. The project will host one meeting of the Intermountain Regional EMSC Coordinating Council in Colorado.
4. All activities will be coordinated through the EMSC staff supervised by the State training coordinator, with guidance from an executive committee of the Pediatric Emergency Care Committee.

EVALUATION: The following project components will be evaluated:

1. Pediatric Emergency Training:
   a. Interactive videodisc: The pretest/posttest tool developed by Idaho EMSC will be modified for use in evaluating the project. Student evaluations will be collected and analyzed, and the total number of persons trained will be reported.
   b. Pediatric Prehospital Care Course: Student evaluations will be analyzed, and the total number of persons trained will be reported.
   c. Pediatric Vascular Access Course: Student evaluations will be collected and analyzed. State prehospital data forms will be used to document changing rates of successful pediatric vascular access. The total number of persons trained will be reported.
   d. Pediatric emergency training for nurses: The evaluation tools developed for the specific courses will be adapted.
2. Injury prevention:
   a. Prehospital injury prevention resource assistance: Data will be collected on frequency of use of the national and State resources.
   b. Injury prevention/public information officer program: The number of EMTs recruited to coordinate injury prevention efforts in their community will be reported. Evaluation components specific to adapted programs will be used.
   c. Targeted injury prevention program: The number of calendars distributed will be tallied.
3. The Intermountain Regional EMSC Coordinating Council meeting will be evaluated by participants.

EXPERIENCE TO DATE: The project has hired staff and initiated activities to meet our stated objectives. Our Pediatric Emergency Care Committee continues to meet and develop the workplan. Key personnel have participated in national and EMSC meetings to update the project objectives and maintain contacts with other EMSC projects. We have also supplied the Native American calenders to the Ignacio and Towaoc Medical Clinics for dissemination to local families in Indian Health Service areas. The project has also participated in the State's Child Fatality Review Conference.

Georgia Emergency Medical Services for Children
Georgia Division of Public Health
State Emergency Medical Services Office
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Atlanta, GA 30303
(404) 657-6700

EMSC
MCH-134001
10/01/93–09/30/95
Project Director(s):
Keith Wages
Contact Person:
Lynette McCullough

PROBLEM: Broad concern about emergency medical services for children (EMSC) exists along with many basic issues that require specific actions and directions. Particular areas of concern include: (1) Fragmented, unsystematized data collection and analysis; (2) concentration of trained personnel and emergency department resources within a few geographic areas; (3) insufficient focus on specific needs of children in the larger emergency medical services (EMS) system; (4) narrow quality assurance information; (5) high prevalence of intentional and unintentional pediatric injuries; and (6) limited legislative and regulatory authorization and inadequate financing of core system components. In addition, fundamental issues in trauma system development, including emergency medical services for children, need to be addressed.

GOALS AND OBJECTIVES: The project has established the following goals and related objectives.

Goal 1: Provide tiered training to public safety officers, prehospital EMS providers, primary health care providers, and emergency department and critical care nurses and doctors. Training will focus on evaluation of the severity of pediatric illness or injury, assessment, and primary intervention.

Objectives:

a. Enhance the curriculum of mandated basic first aid and continued first-responder training of public safety officers, and train 1,200 public safety officers;

b. Certify at least 1,200 EMS prehospital providers in Pediatric Life Support each year, concentrating on underserved regions;

c. Increase the availability of emergency department/critical care nurses and physicians certified in Pediatric Advanced Life Support (PALS) by offering additional PALS instructor courses so that each region has a minimum of 2 affiliate faculty members and 20 instructors, and offer at least 2 PALS provider courses in each region;

d. Adapt curriculum materials for an enhanced PALS course to be offered at least 90 times; and

e. Strengthen ability of primary health care providers to assess and manage pediatric critical care situations and offer inservice training in all regions.

Goal 2: Impact community behavior concerning illness and injury in children by providing public information and education programs that target injury prevention and care for critically ill and injured children.

Objectives:

a. Establish a cadre of at least 100 trained EMS injury prevention specialists to conduct a minimum of 2,000 unintentional injury prevention presentations in community settings, distribute injury prevention education materials, and train at least 11,000 parents (and others who have regular contact with children) in Bystander Care and/or Pediatric Basic Life Support; and

b. Strengthen the involvement of the EMS community with Georgia SAFE KIDS and local injury prevention groups, and focus attention on EMSC issues within these groups.

Goal 3: Build the capacity of the EMS system to address the needs of pediatric patients and evaluate system effectiveness in treating ill or injured patients.

Objectives:

a. Build support for EMSC activities among the EMS regions, the broader EMS community and health providers, and the public, in order to implement activities, achieve regulatory and statutory changes needed to protect children from injury, and support a viable EMSC system;

b. Refine pediatric emergency department care criteria and pediatric prehospital care protocols and standards related to triage, care, and transport, and promulgate these models; and

c. Establish a surveillance and quality assurance capacity by integrating existing data bases and conducting activities for quality assurance, planning, and policy development.

METHODOLOGY: The Georgia Emergency Medical Services for Children (GEMS-C) approach reflects Georgia's emergency medical services structure and the level and types of activities now underway. Much of the GEMS-C activity will be implemented by the 10 regional EMS offices. This project strengthens existing programs by establishing EMSC resource capacity in weak, predominantly rural areas, augmenting ongoing programs with expanded materials, and delineating procedures for the needs of critically ill or injured children. These activities are combined with comprehensive, cohesive data collection and analysis to guide planning, policymaking, and consensus building among participants in the system to accomplish regulatory and legislative changes.

The approach has three major strategies: (1) Tiered training and information dissemination for health service providers; (2) community-based injury prevention activities; and (3) improvement in the emergency medical services system for children through improved data collection and analysis, standard setting, regulatory and legislative initiatives, and overall trauma system development in emergency medical services for children.

EVALUATION: Process evaluation will track progress in the following areas: Adherence to workplans, product development, training, levels of field activity, implementation of studies and production of reports, promulgation of protocols and criteria, and enactment of regulatory and statutory changes. Monitoring will be ongoing.

Improving Emergency Medical Services for Children in Massachusetts

Massachusetts Department of Public Health
150 Tremont Street
Boston, MA 02111
(617) 727-1246
(617) 727-0880 fax

EMSC
MCH-254001
10/01/92–09/30/94

Project Director(s):
Janet Berkenfield
Cynthia Rodgers, M.S.P.H.
Robert Vinci, M.D.

PROBLEM: Children differ from adults both physically and emotionally, and the treatment of critically ill or injured children must meet their unique needs. An illness or injury which may not be serious to an adult can have long-term impact on a child's physical and emotional well-being. Emergency medical services for children (EMSC), incorporating prehospital care, hospitalization, rehabilitation, and community followup, must take into consideration the special needs of children.

Approximately 1,420 children (ages birth through 21 years) die each year in Massachusetts. The majority of these deaths are in children under age 1 year, who die from perinatal and medical conditions. Trauma is the leading cause of death in children over 1 year of age, both nationwide and in Massachusetts. In 1990, 583 children ages 1–21 years died in Massachusetts; 365 (62.6 percent) were due to injuries, and 218 (37.4 percent) were due to medical conditions. In that same year, 10,521 children were admitted to a hospital because of an injury. Until recently, there has been no organized statewide plan for providing emergency care for ill or injured children in Massachusetts.

Gaps have been identified in the areas of system standards, training, data, access, and injury prevention. This project will improve and expand emergency medical services for children in Massachusetts, with the intent of integrating pediatric standards into a variety of services that will be sustained after the grant period.

GOALS AND OBJECTIVES: The overall goal of the project is to ensure delivery of state-of-the-art emergency medical services to all children in Massachusetts in a coordinated and efficient manner, in order to reduce mortality and morbidity resulting from illness or trauma.

Six project objectives have been identified:

1. Develop pediatric practice standards and policies and integrate them into the State's emergency medical services (EMS) system;
2. Increase the level of knowledge and skill required among emergency medical personnel to effectively care for ill or injured children;
3. Improve the quality of hospital data that can be used to monitor the incidence and causes of nonfatal childhood injury hospitalizations;
4. Create a baseline for evaluating EMS system performance over time;
5. Reduce access barriers to emergency medical services for all children in Massachusetts; and
6. Increase collaboration between EMS providers and injury prevention practitioners in statewide and community-based projects.

METHODOLOGY: The following methods are used to achieve the project objectives:

1. Standards: Pediatric protocols and standardized ambulance equipment lists will be distributed to prehospital providers and guidelines will be developed for aeromedical and interfacility transfer.
2. Training: Pediatric curriculums will be developed for training emergency medical technician (EMT) instructors, paramedics, and emergency department nurses and physicians. EMT instructors will, in turn, have an impact on 3,000 licensed EMTs across the State.

3. Improvement of data on injuries: Through advocacy, education, and targeted site visits, the project will promote improved documentation of injury by including external codes of injury (E codes) in hospital discharge records.
4. Evaluation of EMS system performance: A study will be carried out to determine the extent of pediatric trauma regionalization within the current system.
5. Access: Access barriers to emergency medical services, particularly among minorities, will be documented, and a plan will be developed to reduce these barriers. A brochure will be developed and a series of training programs for nurses will be conducted to better link families of children with special health needs to available supportive and therapeutic services.
6. Injury prevention: The project will target key EMS providers and injury prevention practitioners for activities that increase collaboration. Activities include a needs assessment, seminar, newsletter, and contracts for community projects.

Major EMS activities are carried out by the Massachusetts Public Health Department, Office of Emergency Medical Services, to revise and enhance emergency services in the State. This EMSC project is integrating all of its activities with those of the Office of Emergency Medical Services through the EMS 2000 Initiative (a bill pending in the State legislature). In addition, the project has developed a number of working committees that involve EMS providers and administrators from all regions of the State.

EVALUATION: Process measures will be used to monitor the progress of each of the six objectives to assess the impact of project activities on the EMS system. Every activity will be tracked by staff and reviewed by the steering committee. The trauma regionalization study will provide baseline data for comparing the system's performance before and after the EMSC initiative.

EXPERIENCE TO DATE: Project staff have been hired, and a steering committee is meeting on a regular basis. A statewide advisory council is being formed and will meet twice a year to give overall direction to the project.

Progress has been achieved on the first three objectives. Eleven pediatric protocols have been written for prehospital providers, and planning is underway for training EMT instructors in pediatric emergency care. This training will include curriculums for new EMTs as well as refresher training for experienced EMTs. The training is being planned and evaluated by the training committee, which draws its membership from all regions of the State. The Public Health Department is producing a position paper in support of E-coding of all hospital injury diagnoses, and is working with the Massachusetts Hospital Association to report to hospitals on their progress with E-coding.

Michigan Model for Improving Pediatric Emergency Medical Services

Michigan Department of Public Health
Emergency Medical Services Division
P.O. Box 30195
Lansing, MI 48909
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(517) 335-8587 fax

EMSC
MCJ-264001
10/01/91–09/30/94
Project Director(s):
John Hubinger
Contact Person:
Pat Hebert

PROBLEM: This project addresses the number and impact of childhood injuries in the State of Michigan. Target populations include emergency care physicians, emergency medical technicians (EMTs), school children, and parents.

GOALS AND OBJECTIVES: The overall goal of this project is to reduce the number and impact of childhood injuries in the State. The project has identified two broad objectives (one in training, the other in injury prevention):

1. Continue training of emergency personnel in Michigan to enhance their skill in dealing with pediatric emergencies and their awareness of the provider's role in preventing childhood injuries; and
2. Continue work on prevention of childhood injuries, focusing especially on fire and violence among schoolchildren (birth through elementary school) and their parents.

METHODOLOGY: The project will implement a total of eight activities—three to accomplish the training objective, and five to accomplish the injury prevention objective.

Training activities follow:

1. The Michigan Chapter of the American College of Emergency Physicians will retain a national speaker on pediatric emergencies to address their annual convention, the 21st Michigan Emergency Medicine Assembly (July 12–15, 1994). This activity will augment the work of the previous year, when physicians and paramedics were trained in Advanced Pediatric Life Support.
2. Continued support will be offered to a successful annual program in Michigan's Upper Peninsula. The Upper Peninsula Emergency Medical Services (EMS) Regional Conference, sponsored by the Upper Peninsula EMS Corporation, reaches emergency medical services providers who are unable to attend the annual conference in the lower peninsula.
3. Continued support for Michigan's new pediatric curriculum will be offered to the State's Instructor-Coordinator Society. A pool of pediatric items for the EMT licensure exams will be developed. Copies of the curriculum will be distributed, and supporting audiovisual materials (including childhood injury prevention materials) will be acquired.

Injury prevention activities follow:

1. A project entitled Kids Say No to Guns, developed through Children's Hospital of Michigan (Detroit), will be expanded and will include EMT involvement in year 3. A collaborative school program with EMTs, firefighters, and police will be developed to send the violence prevention message to children, parents, and staff of Neinas Elementary School.
2. Children's Hospital of Michigan will expand its year 2 activities in scald prevention by developing public education tools for use in emergency department waiting areas. The project will also expand topically, to include selected injuries among the top five injuries that cause death to Michigan's young children (through 14 years of age).

3. In year 3, the Benton Harbor and Benton Township Fire Departments will expand their collaboration with local hospitals to include information packets on the top five childhood injuries. These packets will be filled with information that is easily read and well illustrated to help parents protect their children from injury.
4. Distribution of smoke detectors and batteries in a low-income area will be refined and expanded during FY 1993–94. A public education effort (linked with the battery project) directed at latchkey children will be improved. Distribution will again occur through the Benton Harbor and Benton Township Fire Departments.
5. The Michigan Association of School Nurses spearheaded a project during year 2. During year 3, broad review and consideration of a school injury form will be needed, and a 1-day seminar is planned on the form and implications of its use. Following review and subsequent revision, the form will be pilot tested.

The Michigan Department of Education is now involved in planning a standard school injury report form, with expanded involvement expected during FY 1994. Other State agencies (Social Services, Mental Health, Office of Highway Safety Planning, and Education) and local health departments will also be involved in the Region V meeting on childhood injury prevention, planned for September 1993.

EVALUATION: All project activities will be conducted under subcontracts which include detailed workplans, timetables, responsible parties, and budgets. Measurable objectives to be accomplished and reported quarterly provide the primary tracking mechanism. Work on subcontracts begins immediately at the start of FY 1994.

EXPERIENCE TO DATE: Project accomplishments include the following: A seminar for 136 instructor-coordinators on pediatric emergencies (June 1992); publication of the pediatric emergency management curriculum (August 1992); final report of Phase I of the University of Michigan Data Project (December 1992); distribution of 10,000 injury prevention calendars to hospitals statewide (January 1993); technical assistance seminar for subcontractors (January 1993); training of three persons in juvenile firesetter behavior (February 1993); start of latchkey "survival" training in 13 elementary schools (May 1993); funding of five speakers on pediatric emergencies for annual EMS Expo (April 1993); distribution of 250 smoke detectors and 1,500 batteries (May 1993); and Kids Say No to Guns program at Children's Hospital (May 1993).

Certain delays in implementation have occurred due to staffing changes in the Emergency Division (Michigan Department of Public Health) and loss of a portion of the data. Overall, progress has been steady and satisfactory.

Addressing the Emergency Medical Needs of Children in Minnesota
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EMSC
MCH-274001
10/01/93–09/30/95
Project Director(s):
Jennifer E. Deschaine, R.N.

PROBLEM: The Minnesota Department of Health recognizes that the special needs of children with serious trauma and illness challenge the organization, personnel, equipment, and facilities of emergency medical services (EMS) providers statewide. The Minnesota Department of Health does not have the funds and staff to study the status of Minnesota's emergency medical services for children (EMSC) thoroughly and to provide the needed resources and leadership based on the results of the study. The Minnesota EMS system lacks an ongoing statewide coordinated effort specifically focused to meet children's needs for emergency medical services. The system lacks standardized prehospital protocols and training in pediatric emergency care for prehospital personnel, as well as coordination of pediatric prehospital, hospital, and rehabilitation resources.

GOALS AND OBJECTIVES: The project has established the following goals and related objectives:

1. Establish EMSC capacity in the Minnesota Department of Health by hiring an EMSC coordinator and support staff;
2. Make pediatric emergency care training accessible to EMS prehospital providers statewide, emphasizing services that target Minnesota's Native American population;
3. Conduct a retrospective study of pediatric ambulance run reports to identify special needs and to develop appropriate protocols for EMS providers;
4. Develop, modify, and distribute pediatric emergency care triage, treatment, and transport protocols to ambulance services, using the findings of this retrospective study (goal 3); and
5. Examine the pediatric emergency care resources of each of Minnesota's 149 acute care hospitals and provide hospital-specific supplemental resource materials to enable each hospital to improve its emergency care and rehabilitation capabilities.

The project has identified the following objectives, to be accomplished within the specified time periods:

1. Hire an EMSC coordinator and one support staff person (by month 2);
2. Convene an appropriate steering committee to serve as a resource in planning, developing, and guiding the Pediatric Emergency Care Courses, the regional data study, the hospital assessment self-studies, and the prehospital protocols, and develop criteria for regional retrospective ambulance run data studies (by month 4);
3. Develop provider and instructor course curriculums based on present Pediatric Emergency Care Course curriculum. Complete contractual agreements for pediatric courses, regional data studies, the hospital assessment self-studies, and the prehospital protocols (by month 5);
4. Measure the learner objectives through pretests, posttests, and course evaluations. Begin to offer instructor training, provider training, and instructor and provider refresher training courses (by month 6 and throughout the project period);
5. Develop criteria for a hospital self-study assessment booklet and distribute the booklet to Minnesota acute care hospitals; produce final reports from 1992 and 1993 retrospective regional ambulance run data studies (by month 7);

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6. Provide one instructor course for Indian reservations through a subcontract with the Bemidji Area Indian Health Service; create a review team for hospital assessment (by month 8);
7. Develop resources for hospital self-study assessment packets (by month 10); and
8. Produce and distribute pediatric emergency medical care triage, treatment, and transport protocols; distribute resource packets as indicated by the hospital assessment study; and evaluate and replicate products and strategies developed in Minnesota for use in other States involved in EMSC activities (by month 12).

METHODOLOGY: We will provide leadership and technical support by creating the position of EMSC coordinator to organize activities related to emergency medical services for children. The steering committee will serve as a resource for the EMSC coordinator and for the Commissioner of Health by providing expertise and experience concerning emergency medical services, trauma, and EMSC policy and procedures. The steering committee consists of personnel and institutions representative of our tiered EMS system. We will train Pediatric Emergency Care Course trainers, who will subsequently train providers in their respective regions, involving more than 800 emergency medical technicians (EMTs) and first responders statewide during the first year of the project.

Minneapolis and St. Paul Children's Hospitals will design onsite pediatric emergency care internships for EMTs. The retrospective study will use ongoing regional project ambulance run review data from four Minnesota regions. To develop prehospital protocols, we will (1) coordinate efforts with our Federal grant on trauma, (2) use information from the retrospective study and the Trauma Registry and Brain and Spinal Cord Registry, (3) refer to guidelines from the American College of Emergency Physicians and the American College of Surgeons, and (4) collaborate with members from the Minnesota Association of Emergency Physicians (an association of physicians who are medical directors for EMS programs), Emergency Nurses Association, and first responders and EMTs.

To assess the pediatric emergency care resources of Minnesota's 149 acute care hospitals and to develop supplemental resource materials, the Virginia and California hospital pediatric emergency care assessment programs and the Minneapolis and St. Paul Children's Hospitals will serve as resources. We will use the data collected to propose necessary legislation, following the second year of the project.

EVALUATION: Project objectives are stated with specific timelines to allow straightforward evaluation of their accomplishment during the first year. Following are examples of specific evaluative questions: Did we achieve our target dates for curriculum development and course offering? Did we achieve our target number of trained instructors and providers? Did we produce the final reports, protocols, and resources needed in the time allotted?

Quarterly reports will monitor activities of the studies, and pretests and posttests will document changes in provider knowledge after each learning course module.

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EMSC
MCJ-294001
10/01/91-09/30/94
Project Director(s):
Kenneth E. Cole, Jr.

PROBLEM: This project addresses a target population of children with unmet needs under the age of 14 years, especially those living in metropolitan and rural areas of Missouri. The project is designed for statewide impact.

GOALS AND OBJECTIVES: The overall goal of this project is to reduce the State's childhood mortality and morbidity resulting from severe illness or trauma. This goal will be accomplished by enhancing the capabilities of Missouri's emergency medical services (EMS) system to respond to the needs of children.

The project has identified the following objectives:

1. Designate an administrative structure to ensure efficient and effective coordination of resources, data management, programmatic continuity, and long-term impact on the EMS system. The project will appoint a full-time coordinator (funded partially through this grant and partially through the lead agency). In addition, the Pediatric Subcommittee, which represents the major emergency medical resources in the State, will serve as the oversight and advisory committee.
2. Increase the capacity of first medical responders to apply the most current emergency care procedures to the care of children. This objective aims to reduce the financial barriers to Pediatric Advanced Life Support (PALS) training courses by supporting tuition scholarships for the education/training specialists and medical directors of ambulance companies throughout the State. The project will establish an ongoing PALS program for training the emergency medical technicians-paramedics of St. Louis City and Kansas City Emergency Medical Services.
3. Increase the capacity of second medical contacts to respond to the emergency care needs of children. This objective aims to implement a pilot program using existing self-learning modules for nurses in rural Missouri.
4. Establish an outreach effort in St. Louis and Kansas City to "adopt" bistate regions in order to encourage development of emergency medical services for children (EMSC) systems and initiatives.
5. Coordinate and extend the pediatric capacity of Missouri's existing prevention resources. This objective will focus on a population of children with unmet needs in the State and implementation of projects to evaluate the primary care resources available, and on the portion of the pediatric population that uses emergency services inappropriately. A marker to evaluate effectiveness of prevention/primary initiatives will be developed.
6. Expand a computer data base directory of rehabilitation resources for children ages birth to 16 years. Expanding the existing data base to include services for children up to age 16 will be a unique resource, completing the spectrum of services in Missouri from prevention to rehabilitation. In addition, a workshop is planned to address enhancement of rehabilitation services for children in the State.

METHODOLOGY: The State has a well-established emergency medical services system in place. This project seeks to enhance the EMSC system for the benefit of all children. This proposal was developed in a joint effort between the Bureau of Emergency Medical Services and the Pediatric Subcommittee of the State Advisory Council on Emergency Medical Services. Project objectives are based on a statewide survey of

emergency medical personnel; an analysis of existing mortality, morbidity, and prevention data; and the assistance of an EMSC consultant.

As the grantee, the Missouri Department of Health is responsible for overall coordination of grant activities; the coordinator of each project component is responsible for coordinating activities related to specific components and reporting to the Pediatric Subcommittee of the State Advisory Council on Emergency Medical Services.

EVALUATION: Project evaluation will be coordinated jointly through the Pediatric Subcommittee and the EMSC project coordinator. Specific methodologies appropriate to each objective will be employed.

EXPERIENCE TO DATE: The coordinator of the project's Pediatric Advanced Life Support component reports that 67 paramedics have completed the PALS courses and a core of 15 St. Louis City paramedics have completed the PALS instructor program.

The coordinator of the Nursing Modules component has compiled interest surveys and identified program participants. Three workshops will be held in various locations in July, August, and September to orient 60 nurses to the self-learning modules; distribution of the modules will proceed immediately after the workshops. The coordinator of the *Rehabilitation Directory* component has evaluated and amended the survey instrument used by the resource directory. The coordinator for the regionalization, prevention, primary care, and immunization components has conducted outreach programs in Illinois to educate referring hospitals about the EMSC initiative and to encourage participation in the Federal EMSC program. Protocols for the Primary Care component and the immunization component have been submitted to the Department of Health's Institutional Review Board and have been approved. Letters announcing these projects have been sent to target hospitals.

The Pediatric Subcommittee of the State Advisory Council has submitted its recommendations on changes in hospital licensing regulations requiring hospitals to have transfer agreements for injured pediatric patients. Model transfer agreements have been developed and submitted to the Regional Trauma Committees.

Nevada EMSC Implementation Project
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EMSC
MCJ-324001
10/01/91–09/30/94
Project Director(s):
Sharon Ezell

PROBLEM: There is a need in the State of Nevada to expand and link efforts to improve emergency medical care for children. The Nevada Emergency Medical Services for Children (EMSC) Project addresses the specific training needs for emergency medical personnel to improve overall delivery of pediatric care, surveillance of pediatric emergency data, and public education about prevention, in an effort to ultimately reduce morbidity and mortality among Nevada's children ages birth to 21 years.

GOALS AND OBJECTIVES: The project has established goals in the following areas:

1. Education and training: The project works to integrate pediatric emergency medical services educational programs into the existing emergency medical services (EMS) system, using a previously developed EMSC curriculum modified for the specific needs of Nevada care providers. In the project's third year, at least 166 emergency medical technicians (EMTs) and 160 emergency department nurses will be trained through EMSC programs.
2. Pediatric surveillance system: Using a minimum prehospital data set developed by previous EMSC grantees, the project will link the existing prehospital data collection systems in Reno and Las Vegas with the State's hospital discharge data base. This will yield complete EMSC records on at least 90 percent of pediatric cases in these locations.
3. Public education in prevention: In its third year, the EMSC project will complete the posttesting of families who received childhood safety education calendars during the previous year. In addition, the Spanish translation of the Nevada seatbelt law will be distributed by EMS personnel at all preschools in the Hispanic community in Las Vegas.

METHODOLOGY: The project is implementing the following activities:

1. Education: Ten EMSC prehospital courses will be taught at 8 rural sites in the third year, and at least 166 EMTs will be trained. At least 160 emergency department nurses will participate in 4 EMSC pediatric emergency department courses. This will meet the original project target of training 500 EMTs and 200 emergency department nurses.
2. Pediatric surveillance system: The project will continue to collaborate with the Nevada Medical Data Project. Linkages between the prehospital records and hospital discharge records achieved for the Las Vegas area in the current year will be accomplished in the Reno area in the third year. The overall process will be further refined and checked for accuracy. Ultimately, complete EMSC records consisting of prehospital and hospital discharge information on at least 90 percent of pediatric cases will be available for review.
3. Public education in prevention: Childhood safety education calendars were distributed throughout the Native American population of Nevada during the current project year. In the third year, EMSC staff will administer posttests to families who received calendars to evaluate changes in their level of knowledge of childhood safety information. In addition, EMSC staff in the Las Vegas area will collaborate with local EMS staff to distribute the Spanish translation of the Nevada seatbelt law to 100 percent of the preschools in the Hispanic community in Las Vegas.

4. Coordination: The project manager will continue to supervise the project on a statewide level and also serve as coordinator for project activities in the northern part of the State. The southern coordinator will continue to manage project activities in the southern part of the State. Close coordination will continue with EMS activities in Clark County (Las Vegas), Washoe County (Reno), and the State EMS Office.

EVALUATION: The number of emergency medical technicians and emergency department nurses trained in EMSC programs will be monitored by project staff. Once the prehospital data are linked with the hospital discharge data and reports are generated, records will be manually sampled for accuracy. Project staff will monitor the number of preschools that receive information on child restraint statutes; statistics will also be monitored on compliance with the child restraint law.

EXPERIENCE TO DATE: The original goals and objectives of the project have not been attained, due largely to a 9-month administrative delay in initiating project activities. Since operations have begun, the project has achieved most of its goals and objectives on schedule after correcting for the initial delay. Completion of project goals and objectives is anticipated by the conclusion of the third year.

In the first 2 years, 150 paramedics, 184 EMTs, and 40 emergency department nurses completed EMSC courses administered by the project. A prehospital curriculum and emergency department nurses' curriculum have been identified, and project workgroups continue to edit course materials to suit the needs of Nevada pediatric emergency care providers.

Initial automated linkage of prehospital and hospital discharge records has been accomplished for the Las Vegas area (Clark County). Due to changes in the State's mandatory reporting regulations, automated linkage is being developed separately for the Reno area (Washoe County). Due to backlogging and raw data inaccuracies, linkage in the rural areas of the State has been postponed. Efforts will focus on achieving linkages in the Reno area in the third year of the project.

Approximately 850 child safety education calendars were purchased from the Utah EMSC Project and were distributed through the Indian Health Service clinics by public health nurses. The Nevada EMSC Project will administer posttests to recipients in the third year of the project.

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EMSC
MCJ-334001
10/01/91–09/30/94
Project Director(s):
Janet Houston

PROBLEM: Historically, the New Hampshire Emergency Medical Services (EMS) community has concentrated its efforts on adult trauma and medical emergencies and has devoted less attention to the specific needs of pediatric patients. This oversight is indicated by the lack of prehospital pediatric treatment protocols for basic emergency medical technicians or a pediatric triage mechanism, and the minimal amount of training dedicated to pediatric emergencies. Overall, EMS in New Hampshire has been oriented more toward intervention and less toward prevention. Emphasis on public information and education programs could be essential for the improved quality of care offered to New Hampshire's children.

GOALS AND OBJECTIVES: The mission of the New Hampshire Emergency Medical Services for Children (EMSC) project is to develop an integrated program to reduce the incidence of preventable pediatric emergencies and to improve the outcome of acutely ill and injured children. The project will continue to focus on four areas: Education programs for prehospital and hospital providers; public information and education efforts; EMSC system development; and quality assurance and data evaluation.

METHODOLOGY: In order to achieve its stated goals, the New Hampshire EMSC project plans the following activities:

Education programs:

1. Organize 12 pediatric prehospital care continuing education courses;
2. Continue to provide EMSC prehospital continuing education programs;
3. Organize one intraosseous infusion training program for paramedics;
4. Organize two pediatric emergency nursing courses;
5. Continue to use the Idaho EMSC interactive videodisc to train prehospital care providers in pediatric respiratory emergencies;
6. Organize two additional Advanced Pediatric Life Support (APLS) courses for physicians, nurses, and paramedics; and
7. Assist the New Hampshire chapter of the American Hospital Association in organizing Pediatric Advanced Life Support (PALS) courses.

Public information, education, and prevention program:

1. Finalize development and distribution of an EMSC media kit to the Bureau of Emergency Medical Services, the EMS community, and hospitals;
2. Distribute an injury prevention package to EMS personnel;
3. Complete a public information program based on social marketing principles; and
4. Continue to provide articles to EMS newsletters in the State.

EMSC system development:

1. Survey all acute care facilities about personnel, equipment, and current capabilities;
2. Develop a directory of rehabilitation resources for chronically ill, injured, and disabled children; and
3. Organize meetings of the pediatric committee to complete tasks related to standards of care.

Quality assurance and data/evaluation:

1. Conduct a pilot study on the EMSC minimum data set in the two hospitals currently using a trauma registry and E-codes;
2. Implement a regional demonstration study of community hospitals to collect the EMSC minimum data; and
3. Select sentinel pediatric injuries to track patients through the EMS system in order to evaluate treatment, triage, and transfer of the injured child from the prehospital phase through hospitalization and rehabilitation.

The project ensures coordination through cooperation with a variety of agencies, including the New Hampshire State Health Department and the Bureau of Emergency Medical Services. New Hampshire EMS meets regularly with the New Hampshire Medical Directors. The principal investigator of this project acts as chair for the pediatric task group of the New Hampshire Trauma System Development Program. The drowning prevention project in New Hampshire EMS Region IV is another coordinated effort, through which the New Hampshire Injury Prevention and Resource Center has assisted this project.

EVALUATION: The project has included evaluation in all aspects of its activities and objectives. The educational programs will include examinations before and after the course administration and student course evaluation questionnaires. Sentinel injury studies will determine treatment and triage patterns and track patients to rehabilitation facilities to determine whether the directory has had an impact on the rehabilitation portion of medical care.

EXPERIENCE TO DATE: Due to the late start of the project and because of personnel issues, anticipated progress has not matched the original grant schedule. However, a substantial list of products highlights the successes of the project to date. Following is a partial list of products by category: Pediatric Trauma Care course (curriculum, slides, and student packet); Planning to Avoid Childhood Emergencies (PACE) class (instructor guide, slides, and participant safety and resource guide); Advanced Pediatric Life Support course (publicity); public information and education (brochures, public service announcements, telephone stickers, newsletter articles); and surveys (equipment, hospitals, and community education).

Pediatric Emergency Medical Services System Development for New Jersey
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EMSC
MCJ-344001
10/01/91-09/30/94
Project Director(s):
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PROBLEM: This project addresses the fragmented provision of pediatric emergency medical services in New Jersey, in order to fully define the problem and to develop a focused approach for remediation. New Jersey is the Nation's most densely populated State, but has many urban, suburban, and quasi-rural areas within its boundaries. According to the 1990 census, children comprise 23 percent of the population (7,730,188). As a shoreline "corridor State," New Jersey also has many travelers and visitors.

GOALS AND OBJECTIVES: The goals of this project are to:

1. Support public information programs to prevent pediatric emergencies;
2. Establish linkages with other programs to disseminate information to families of children in special populations (special health needs, minority, and/or low income);
3. Replicate pediatric emergency medical services (EMS) educational programs for prehospital basic and advanced life support providers and emergency department physicians and nurses;
4. Support advisory groups of specialists in pediatrics and emergency medical services who will work collaboratively on pressing issues and identify problems in the delivery of pediatric EMS care; and
5. Identify and enhance appropriate pediatric data bases.

Program objectives in the coming year are to:

1. Support public information programs to prevent pediatric emergencies;
2. Use linkages with Special Child Health Services and other groups to disseminate information to families of children with special health needs and work with programs that serve minority children, such as the Special Supplemental Program for Women, Infants and Children (WIC), in developing plans to incorporate program features into appropriate activities;
3. Train instructors in emergency medical services for children (EMSC) prehospital courses in basic and advanced life support, replicate programs for physicians and nurses, and train appropriate instructors;
4. Support advisory groups of specialists in pediatric care and EMS who will work to promote pediatric patient care standards and participate in and publish related research;
5. Ensure that pediatric data are included in the State's trauma registry;
6. Form an EMSC Advisory Council, as mandated by law;
7. Seek ongoing funding and program support to continue EMSC efforts;
8. Support statewide dissemination of the high school prevention component of the Think First Program/Head and Spinal Cord Injury Prevention Program;
9. Develop a pediatric injury prevention program which can be presented in the community by EMS providers;
10. Develop a comprehensive statewide EMSC data base to monitor and analyze related activities and trends; and
11. Develop online computer capability with MCH-Net.

METHODOLOGY: The project is being directed by the Department of Health's Office of Emergency Medical Services. Three subcontracts have been awarded in the areas of training, pediatric illness, and pediatric trauma. Each part of the project addresses a particular problem area. The EMSC program is replicating the ChUMS program (University of New Mexico EMSC project) as a pilot for 1 year to determine feasibility for statewide implementation. Basic and advanced prehospital life support courses will be replicated from the North Carolina EMSC project. The Advanced Pediatric Life Support course (an American College of Emergency Physicians course) will be offered for the first time in New Jersey. Pediatric injury prevention will be addressed using two approaches: (1) A course will be offered for adults at community gatherings, through the State's emergency medical technition network; and (2) a program will be taught in junior and senior high schools by educators from designated trauma centers and nearby rehabilitation facilities.

Coordination of activities in the three subcontracts is being directed by the Office of Emergency Medical Services. The office works with other programs within the Department of Health, such as Health Promotion/Disease Prevention, Special Child Health Services, and WIC, works with the Department of Human Services, and anticipates cooperative programs with the Division of Highway Traffic Safety. Additionally, the Office of Emergency Medical Services is involved with SAFE KIDS on the State and focus track levels, and with the Sudden Infant Death Syndrome (SIDS) Resource Center.

EVALUATION: Each subcontract contains criteria for evaluation. Progress is monitored by site visits and by written reports submitted quarterly. All new program activities will be revised by the EMSC program and/or EMSC Advisory Council prior to implementation. Course evaluations will be reviewed and program adjustments will be made as indicated.

EXPERIENCE TO DATE: There were early delays in setting up funds, awarding the subcontracts, and hiring the program manager. Despite these delays, efforts are well underway, although the project is still about 9 months behind its original timeframe. The highlight of the past year was the passage of New Jersey's law concerning emergency medical services for children, the first such legislation in the country.

Development of new curriculums for both basic and advanced prehospital providers proved too cumbersome, so replication of North Carolina EMSC project's prehospital programs will be substituted, once New Jersey's critical illness and trauma protocols (currently being developed) have been approved. The trauma subcontractor hired a full-time coordinator and is progressing rapidly in areas of pediatric trauma protocols, trauma data analysis, and education. The original activities of the pediatric illness subcontractor will be nearly completed by early fall.

The ChUMS project was presented to an ad-hoc committee, and limited implementation of this program was determined to be most practical; a 1-year pilot program will be used to evaluate its effectiveness in New Jersey.

In addition, the EMSC program manager has worked with many organizations to gain visibility and support for EMSC in the State.

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EMSC
MCJ-354001
10/01/90–06/30/94
Project Director(s):
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PROBLEM: The mortality, morbidity, and economic burden associated with childhood trauma and illness represent a serious public health problem in the United States. This is especially true in New Mexico, where our State's attention to the needs of children was ranked 49th out of 50 by the Children's Defense Fund. Improved emergency medical services for children (EMSC) can improve our children's health; however, several barriers must be overcome before emergency medical services (EMS) can reach all children in the State. These barriers include the rural nature of the State, which hinders rapid transport; widespread poverty; parents' and caregivers' lack of knowledge about emergency medical services systems; and a communication gap among the three major ethnic groups that must work together to make the EMS system function efficiently.

The New Mexico EMSC project has made significant progress in overcoming these barriers and in improving the health of children in our State.

GOALS AND OBJECTIVES: The long-term goals of this project are to reduce the frequency and severity of negative outcomes for children and families who have suffered an emergency, and to promote preventive activities to reduce injuries and critical illnesses that generate pediatric emergencies. Project activities will emphasize reducing interpersonal violence, motor vehicle injuries, and unintentional firearm injuries; and improving emergent care for chronically ill children.

METHODOLOGY: To reduce pediatric morbidity and mortality, we are using a multifaceted approach that includes:

1. Activating a childhood injury prevention component, which includes promoting peer educators on interpersonal violence in schools; highlighting firearm safety programs in both schools and communities; increasing the use of child restraint devices and seatbelts, especially among Native American populations; and encouraging injury prevention efforts among emergency medical technicians (EMTs);
2. Improving pediatric EMS clinical care: This component encompasses working with rural providers in community settings, cross-training of pediatric and emergency medicine residents, and enhancing pediatric EMT training;
3. Improving the data collection capabilities and analysis of childhood injuries through the New Mexico Trauma Registry and other available data bases; and
4. Supporting existing coalitions of child care advocates by involving key community leaders in the EMSC grant; adding additional groups as identified; and integrating the EMSC task forces, composed of statewide volunteers from health and social services fields, into a statewide coalition.

EVALUATION: Methods to track and evaluate our progress include:

1. Integrating EMSC priorities through an executive committee composed of EMSC coprincipal investigators, a project manager, a pediatric paramedic instructor, a financial advisor, and a program specialist;

2. Guiding EMSC priorities through a steering committee, composed of key community leaders, that meets quarterly to direct and advise the efforts of the executive committee and task force;
3. Developing, implementing, managing, and reviewing the efforts and projects of the EMSC task forces; and
4. Coordinating and periodically reviewing existing data bases to examine the effectiveness of intervention strategies relevant to pediatric health issues.

EXPERIENCE TO DATE: To achieve project objectives, we formed 10 task forces, each directed toward improving particular aspects of emergency medicine, injury prevention, and health promotion for children in New Mexico. Task forces have enabled the EMSC project to empower communities to identify and implement effective strategies that will improve EMS for children throughout the State. People from diverse backgrounds have begun working together on the common goal of improving the health and safety of New Mexico's children.

Each task force addresses a specific focus:

1. The Interpersonal Violence Task Force introduced a pilot program on interpersonal violence prevention at a local middle school that involves students, families, school staff, and administrators. A pretest student survey assessed knowledge, attitudes, and behavior toward violence. A coordinator facilitates school activities that address dispute resolution, anger management, intergender violence, peer pressure, drug abuse, and suicide. A survey will be administered in September to assess if students' attitudes toward interpersonal violence have been changed by the project.
2. The Student Task Force is working with school-based health clinics at an elementary, middle, and high school. Each clinic is conducting pretest and posttest surveys and is implementing self-esteem curriculums. End-of-the-year activities will be coordinated to promote a peer educator exchange among the three schools.
3. The Firearm Safety Task Force is focusing efforts to elevate public awareness about the importance of firearm safety; specific efforts included airing televised firearm safety public service announcements in August and December, two months with statistically high injuries; distributing handbills on firearm safety in both English and Spanish to health clinics, hospitals, schools, and gun store owners; encouraging pediatricians to address firearm safety as an issue during well-child visits; participating in a televised morning talk show; staffing booths at health fairs and gun shows; presenting gun safety lectures at health conferences and schools; and working with schools to incorporate firearm safety as part of their health curriculum.
4. The Children's Motor Vehicle Safety Task Force developed a resource manual for local communities to initiate and implement child safety seat programs; technical assistance and car seat training is provided to these communities upon request. The task force also developed self-sustaining rent-to-own child restraint programs around the State for public health clinics, hospitals, and Indian Health Services. The programs include prenatal and postnatal information on the correct use of child restraint devices.
5. The Care of Chronically Ill Children Task Force is distributing an initial 500 Child's Updated Medical Summary (ChUMS) Cards. ChUMS is a pocket-sized set of cards that contains medical information about the child's conditions and is kept up to date by the caregiver. In a medical emergency, the caregiver presents ChUMS to the emergency care provider, putting the child's medical record at his or her fingertips. A survey will be conducted to evaluate the effectiveness of the program.
6. The Legal Task Force supported a third-year law student's research on existing statutory and case law pertaining to child abuse and neglect in New Mexico. The research is being used by the Child Abuse Task Force to promote an increased role for emergency physicians in identifying and reporting child abuse.
7. The Data and Research Task Force provides technical support to guide current research projects on pediatric pedestrian injuries, prehospital response to pediatric calls; and a retrospective medical chart review of pediatric trauma hospital care.
8. The Rural and Minority Outreach Task Force developed a format to bring health fairs to rural communities of our State. In conjunction with local resources, the task force recruits speakers and provides materials in response to the particular health concerns of the community. Efforts have

concentrated on reaching Hispanic, Native American, and agrarian families; empowering local health resources to use injury prevention strategies; and highlighting appropriate use of the EMS system.

9. The Quality of Care Task Force conducted a retrospective chart review of all pediatric trauma patients admitted to our Level I Trauma Center in 1990. The data gathered indicate that most children who are admitted are not using car seats, seatbelts, or other protective devices that could reduce the incidence or severity of injuries. The chart review also revealed that horse-related injuries were one of the leading causes of hospital admissions for this group of trauma patients.

10. The Child Abuse Prevention Task Force is working to enhance the physicians' roles and responsibilities in identifying and reporting child sexual abuse. A flow chart form for identifying and reporting child sexual abuse was drafted and is currently being tested at selected clinics to determine its effectiveness; upon completion and success of the preliminary review, the task force will work with the New Mexico Human Services Department to incorporate the form into regulatory procedures.

We hired a bilingual health educator to work with the Gallup Indian Health Service on the Navajo reservation. The educator is familiar with the Navajo reservation and culture and has organized an infant car seat loaner program. The full-time commitment of a Navajo-speaking individual to a car seat program is seen as the fulfillment of a tremendous need, especially in the remote areas of the reservation.

Improved clinical care within our pediatric emergency system is a major EMSC goal. We have hired a pediatric emergency medicine specialist to initiate cross-training seminars for our emergency medicine and pediatric residents. In addition, a pediatric paramedic instructor is devoted full time to pediatric EMT training issues. We have also sponsored the attendance of two emergency nurses at the Florida EMSC Emergency Nursing Advanced Pediatric Management Seminar; in return, the two nurses trained 48 instructors and 235 providers statewide during 1991 and 1992 and will continue their efforts into 1993.

We have begun several research projects related to pediatric motor vehicle injuries and analyzed data from the medical investigator's office to develop a profile of childhood pedestrian deaths. We are compiling a data base of all critically ill and injured children who accessed the emergency medical system in Albuquerque for 1991. Data will be analyzed to obtain an EMSC profile of our State's largest city. We are also conducting a retrospective chart review of pediatric trauma patients that will be integrated into the ongoing quality improvement concurrent review.

The New Mexico EMSC project has made significant improvements in the pediatric components of our EMS system. We have enhanced the value and importance of injury prevention strategies in our State. We are confident that many programs we have begun will continue when our funding ends.

North Carolina EMSC Project: A Model System for Statewide Plan Development

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EMSC
MCJ-374001
10/01/90–09/30/94
Project Director(s):
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PROBLEM: A number of deficiencies have been identified statewide in the provision of emergency medical services (EMS) to critically ill or injured children in both prehospital and emergency department settings. There is inadequate pediatric emergency care training and a lack of standardized procedures in the areas of patient care, triage protocols, and transport protocols. There is no statewide mechanism to track the causes of injury and illness in children and to measure the changes in health status in response to system changes. Many emergency departments and prehospital advanced life support vehicles also lack the necessary pediatric-specific equipment. Moreover, the time required to transport an injured child from the scene of the injury to a health care facility is much longer than desirable. Our project will address these EMS health system problems in the pediatric population in North Carolina.

GOALS AND OBJECTIVES: The following goals and objectives were developed for the three specific project activities:

Education and training:

1. Promote currently existing educational programs and target them toward pediatric emergency care;
2. Train additional instructors in Pediatric Advanced Life Support (PALS) and support the dissemination of the Advanced Pediatric Life Support (APLS) course;
3. Develop and disseminate separate educational curriculums in pediatric emergency care for prehospital and inhospital acute care providers;
4. Assist with training and implementation of intraosseous infusions; and
5. Implement use of Broselow® resuscitation tapes and organizers.

Research and data base analysis:

1. Develop a mechanism to identify research questions, initiate research projects, and define data base analysis questions;
2. Create a project review mechanism to facilitate and monitor research;
3. Identify existing research resources, programmatic efforts, and characteristics of data bases in North Carolina;
4. Develop ways to integrate results into regional activities; and
5. Identify and pursue additional sources of funding.

Standards and equipment:

1. Develop model patient care protocols for the prehospital and emergency department provider;
2. Develop model triage protocols for prehospital use;
3. Develop model EMS and emergency department transfer protocols for pediatric patients;
4. Create a list of recommended equipment for the emergency care of pediatric patients in prehospital and emergency department settings; and
5. Implement and evaluate an intraosseous needle program for paramedics in the prehospital setting.

METHODOLOGY: Project staff will implement the following activities to achieve the stated goals:

Education and training:

1. Support educational conferences, such as the North Carolina Transport Institute and the Emergency and Critical Care Annual Conference;
2. Increase the availability of PALS and APLS courses;
3. Revise, adopt, and adapt existing educational materials to create our own training programs for prehospital and inhospital acute care providers; disseminate the educational programs/materials developed; and conduct lectures on pediatric emergency care topics; and
4. Develop an intraosseous infusion training program for EMS personnel.

Research and data base analysis:

1. Develop a strategy for identifying research questions pertinent to our project and stimulating research ideas;
2. Create a mechanism to fund targeted research projects;
3. Develop ways of identifying statewide research resources, programs, and EMS-related data bases;
4. Disseminate the results of activities carried out; and
5. Explore new and continued funding for project activities.

Standards and equipment:

1. Review model protocols developed by other emergency medical services for children (EMSC) projects as well as those from other sources, adapting and adopting those that are deemed suitable for our needs;
2. Review model triage protocols from other sources and develop criteria for triage protocols;
3. Review model patient-transfer protocols, develop and/or recommend protocols to manage the six most common clinical conditions identified, obtain endorsement from the appropriate health care organizations for these protocols, and publish and give wide exposure to these protocols;
4. Review equipment recommendations developed by other EMSC project States as well as from other sources; survey EMS providers and emergency departments to identify equipment deficiencies; and develop lists of recommended equipment for prehospital vehicles, emergency departments, and physicians' offices;
5. Review available educational programs for intraosseous use, and develop, implement, and evaluate an educational and implementation program; and
6. Furnish Broselow® tapes and organizers to all advanced life support vehicles, critical care transport programs, and emergency departments in North Carolina.

EVALUATION: The techniques used to achieve stated goals and objectives will ensure timely and effective completion of all project activities. Specific tracking methods have been designed for each subgroup.

Education and training:

1. Survey EMS directors and emergency departments annually to assess the number of PALS providers in the various health care areas; increase the number of PALS providers in North Carolina by 30 percent in the next year; distribute the list of certified PALS instructors to all regional area health education centers, EMS regional offices, EMS training officers, and all acute care hospital nursing educators so that these groups can generate PALS provider courses; and increase the PALS American Heart Association affiliate faculty from 5 to 10 members. Additional affiliate faculty should increase the number of PALS instructors, thereby increasing the number of both PALS courses and providers. The number of PALS courses will be monitored by checking with the North Carolina American Heart Association.
2. Offer the APLS courses at least once a year in North Carolina and review the course evaluations.
3. Survey emergency departments and EMS providers for their use of protocols developed by the education and training committee; use the pretest and posttest format to evaluate the educational

materials developed; and evaluate the use of the resource material developed and disseminated throughout the State.

4. Evaluate the intraosseous training program developed to determine the number of EMS provider programs that have instituted the intraosseous procedure.
5. Evaluate the use of the Broselow® system using the EMS and emergency department survey results.

Research and data base analysis:

1. Identify research goals and develop a mechanism to review and fund target research grants by December 1991;
2. Define questions and complete available data base analysis by December 1991;
3. Support the implementation of the Emergency Department Injury Surveillance (EDIS) System by funding the purchase of computer hardware for distribution into local hospitals by May 1992; and
4. Compile recommendations from research and educational activities so that they can be incorporated into the clinical care activities.

Standards and equipment:

1. Produce prehospital and ED protocols by September 1992, and gain acceptance and adoption of the recommended protocols by health care organizations statewide;
2. Produce and gain acceptance of triage protocols and patient transfer protocols by September 1992;
3. Develop lists of recommended equipment for emergency departments and prehospital advanced life support vehicles by April 1992; and
4. Implement a program for intraosseous needle use by paramedics in the prehospital setting by September 1991.

EXPERIENCE TO DATE: The major project activity has been the creation of three subcommittees—education and training, research and data base analysis, and standards and protocols—within the EMSC Task Force. Each group has made progress in achieving project objectives. The following activities have been accomplished to date:

1. Project 1—Education and training: Educational materials, including slides, videotapes, textbooks, and manuals, have been obtained from other EMSC project States and other sources. These were reviewed and used to develop a course curriculum for both prehospital and emergency department providers. Nine of the 18 chapters are now complete. The course will be completed in time for the first instructor-training course, scheduled October 2–3, 1992. We have also purchased and selected videotapes and distributed these to emergency departments, area health education centers, EMS resource libraries, and associate colleges responsible for EMS training. We have trained over 90 additional PALS instructors, and one APLS course was held January 1992, with additional courses scheduled for June 11, 1992, and November 12, 1992. A conference, "Practical Approaches to Pediatric Emergency Care" is scheduled to be held August 21–23, 1992, in Myrtle Beach, South Carolina.
2. Project 2—We have collaborated with the Injury Prevention Research Center at the University of North Carolina-Chapel Hill by supporting the distribution of a microcomputer-based emergency department injury surveillance system into four hospitals to supplement the three that are already participating. Useable data should be available for analysis by August 1992. We reviewed 10 project proposals and selected 3 for project support. These research projects are well under way and are scheduled to be completed by September 1992. Several additional research projects have been completed, including a study of nonphysician-based transport of intubated pediatric patients, which will be published in *Critical Care Medicine* in July 1992. A statewide survey of emergency department capability in pediatric care was submitted for publication.
3. Project 3—We are completing our review of protocols for triage, prehospital, transport, and emergency care from various sources. Once this is completed, the standards and equipment subcommittee will develop our own model protocols. A recommended emergency department and prehospital equipment list has been developed. Six Broselow® resuscitation tapes and one organizer was mailed to all 117 acute care hospitals in the State. Two additional organizers and 10 tapes have been ordered for each of

the 45 paramedic and 15 advanced-intermediate EMS agencies in the State. We have also ordered the pediatric-specific equipment identified by the 18 regional EMS offices; each was provided $1,000 for equipment purchases. The intraosseous infusion training program was completed and made available October 1, 1991.

4. Knowledge transfer and utilization: We have planned a knowledge transfer and utilization meeting, inviting the EMS director and representatives from the American Academy of Pediatrics and the American College of Emergency Physicians from nine southeastern States. This conference was scheduled to be held August 19–20, 1992, in Myrtle Beach, preceding our educational conference. We will exchange information about the projects we have developed.

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EMSC
MCJ-394001
10/01/90–09/30/94
Project Director(s):
Kathy Peppe, M.S., R.N.

PROBLEM: Nationally, it has been determined that improvement is needed in prehospital and emergency department care for children. The premise of this project is that the underlying problem in rural areas is a combination of inadequate community organization, deficiencies in training of both prehospital and hospital emergency department personnel, lack of accurate and sufficient local data for assessing the needs of each community and region, and lack of successful planning for improvement and evaluation.

GOALS AND OBJECTIVES: The major goal of this project is to prevent childhood emergencies and to improve emergency medical services for children (EMSC). Project staff believe that EMSC is an intensely local matter and is best accomplished through development of effective local emergency medical services systems with linkage to referral centers. In order for the developed linkages to have any sustainable impact, it is imperative that the effort be supported by local community organizations.

Other project goals include:

1. Detailed examination of the community structure in four rural/farm areas in relation to their history and perceived needs;
2. Development of local emergency medical service (EMS) advisory councils;
3. Development of networks within each region linking local EMS systems with local emergency department personnel and arrangements for local pediatric medical consultants;
4. Linkage of demonstration areas with regional children's hospitals and pediatric medical centers for consultation, education, referral, and case transfer;
5. Concentration on the special needs of children with medical disabilities living in remote areas;
6. Development of training programs for prehospital and emergency department personnel, emphasizing preparation of local trainers to sustain the process after completion of the project; and
7. Development of public information and education programs stressing prevention, awareness of need, first aid, and effective access to emergency medical services.

METHODOLOGY: The project encompasses three phases:

1. Baseline data will be collected on the status of emergency care for children and the perceived needs for improvement, with the participation of relevant agencies, individuals, and the public. The following methods are being used:
   a. A leadership survey, based on interviews with personnel of local hospitals and emergency medical service agencies and other community leadership groups.
   b. Focus groups and nominal group processes with key community leaders and members of the general public, to obtain their views and attitudes about EMSC needs within the specific region.
   c. A detailed study of sentinel cases, reconstructing the sequence of events and the conditions surrounding the occurrence of the emergency, actions taken at the time, awareness of need for emergency services, communication with emergency medical systems, treatment at the site, transport to the hospital emergency department, and subsequent treatment, transfer, and outcome.

We hope that these cases will provide the basis for the development of locally adapted standards for emergency medical care for children.

2. Interventions, to be agreed upon by consensus of community leadership, will include development of information and education programs for the general public, education of prehospital and hospital emergency department personnel, and overall enhancement of the emergency medical service system.
3. Ongoing data collection will focus on determining the relationships between the processes implemented in the first and second year and their effects on the emergency medical system community.

EVALUATION: Throughout the entire project, detailed records have been maintained of every phase of the process, including planning, intervention, and data collection. A survey instrument will be developed for this project to assess the following: Initial status and the effects of the interventions; effectiveness of the training programs; changes in the quality of care; accuracy and compatibility of emergency medical services data and local advisory councils; and increase in linkages between local emergency medical services, emergency departments, and regional referral centers.

EXPERIENCE TO DATE: In addition to the EMSC education programs, data collection efforts, and community organizations that have been initiated in the four selected county clusters of Ohio, special projects have been developed in a lead county in each cluster.

1. In the Appalachian southeastern Ohio county cluster, a project has been developed to train emergency medical technicians (EMTs) as community educators in injury control, first aid, and proper use of the EMS system. A videotape is being developed to assist the EMTs in their pediatric outreach activities.
2. In the Appalachian southwestern Ohio county cluster, the Area Health Education Center has undertaken a community planning effort using the Planned Approach to Community Health developed by the Centers for Disease Control and Prevention. The community is developing a project involving an unintentional injury prevention program targeting transportation injuries.
3. In the northwestern Ohio county cluster, an area that includes many farms, a project has been undertaken emphasizing farm safety and strengthening the linkage between the EMS agencies, Ohio Agricultural Extension office, and hospitals in the region. The EMSC committee has developed a program entitled "Parent Alert—SAFE KIDS Are No Accident." This program includes a curriculum for parents on how to respond to pediatric emergencies and how to use the emergency medical system, along with tips on injury prevention.
4. In the northeast Ohio county cluster, a project has been undertaken with the Amish population, an agrarian cultural minority in Ohio. Holmes County has the largest Amish population of any county in the United States. This effort is built around the introduction of safety education into Amish schools, first aid instruction, and use of emergency medical services. In the Amish schools, lesson plans are being piloted on prevention, first aid, and proper use of emergency medical services for burning, choking, and broken bones. These lesson plans are an exceedingly effective method of engaging the interest of the children, as well as disseminating this information to their families.
5. The Bureau for Children with Medical Handicaps, in collaboration with local health departments, developed a program for children with special health needs, based on a component of the New Mexico EMSC Demonstration Project. This involves a passport-sized booklet that lists the problems and special needs of the child. Information can be entered and updated regularly to be available in case of emergency. The public health nurses also instructed the families in injury prevention, proper use of the emergency medical services system, and special ways of dealing with emergencies involving disabled children.
6. A Tri-State EMSC Alliance has been developed with Ohio, West Virginia, and Kentucky to address regional EMSC needs and to establish resources for rural communities.

Developing and Improving the Capacity of Existing Pediatric Emergency Medical Services in Oklahoma

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MCJ-404001
10/01/91–08/31/94
Project Director(s):
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PROBLEM: Because of years of underfunding and lack of centralized planning, Oklahoma's health care delivery system has fallen behind the expected and even mandated standards recognized by the rest of the country. Data collection is of great importance in defining the emergency medical services (EMS) system of Oklahoma and developing a long-term plan for needed improvements in health care delivery. To date, there have been only sporadic attempts at data collection and analysis for the emergency medical care provided to the children of Oklahoma. Without this data collection, future planning and development are subject to the same mistakes that have been made in the past. At this time, pediatric prehospital care training is limited to the content of the emergency medical technician (EMT) curriculum for paramedics and the EMT basic level, developed by the U.S. Department of Transportation, National Highway Traffic and Safety Administration. Hospital providers (both nurses and physicians) are equally deficient in pediatric training. There is no uniform method or policy for triage, treatment, or transfer of pediatric patients for hospital or prehospital providers. The prevention of child abuse injuries related to shaken baby syndrome has not been well addressed in this State, despite infant deaths.

GOALS AND OBJECTIVES: The project has established the following goals, with objectives specified by months of the project period:

Goal 1: Define Oklahoma's Emergency Medical System.

Objective: Produce and distribute a document that describes the status of emergency medical services for children (EMSC) at the prehospital and hospital level at the end of the grant period.

Goal 2: Develop or improve a method of pediatric EMS data collection.

Objectives:

a. Continue to collect prehospital EMS pediatric care data through month 36 and thereafter;

b. Introduce the Emergency Department Pediatric Injury Report, and provide support training for its use in 3 Indian Health Service hospitals and 10 other hospitals during months 24–27; and

c. Provide monthly reports to prehospital and hospital providers who participate in this data collection system by month 27 and thereafter.

Goal 3: Ensure continued EMSC activities, community planning, and coordination.

Objectives:

a. Proceed with the State funding initiative as part of the trauma care system to continue training and data collection activities for the 1994 legislative year;

b. Maintain involvement through presentations and participation with EMS and child advocacy groups throughout the State to promote EMSC goals; and

c. Cosponsor the 1994 SAFE KIDS 2000 Conference.

Goal 4: Improve EMSC services in prehospital care.

Objectives:

a. Conduct at least four Pediatric Advanced Life Support (PALS) courses to train 25 percent of the EMTs/paramedics during the year;

b. Provide a total of 10 pediatric curriculum workshops in regional sites for instructors of First Responders, EMTs (intermediate level), and EMTs/paramedics during the year; and

c. Complete and distribute prehospital pediatric protocols, in both hard copy and computer format, to 200 EMS providers.

Goal 5: Improve EMSC services in hospital care.

Objectives:

a. Provide pediatric emergency nursing instructor courses in Oklahoma on a regional basis to at least 50 nurses by month 30;

b. Provide onsite assistance, as needed, in presenting Oklahoma pediatric emergency nursing courses;

c. Complete protocols for pediatric emergency care for physicians and nurses and distribute these protocols to all pediatric liaison nurses by month 30;

d. Provide PALS courses to at least 100 nurses and physicians on a regional basis by month 33; and

e. Begin recognition of emergency departments approved for pediatrics by month 28.

Goal 6: Develop and implement a program to assess and increase the knowledge of Native Americans about shaken baby syndrome.

Objectives:

a. Initiate research activities at two Indian Health Service hospitals to begin the shaken baby syndrome project during month 26;

b. Conduct the study at both sites with new mothers for a period of 6 months during months 26–32;

c. Finalize data and make recommendations from the study findings during last quarter of the project period; and

d. Produce and distribute a Spanish-language videotape about shaken baby syndrome presented from a Hispanic perspective (by month 30).

METHODOLOGY: The project will carry out the following project activities to achieve stated goals and objectives:

1. Define Oklahoma EMS and improve data collection: Collect data from prehospital and hospital sources encompassing the total care provided to pediatric patients in the EMS system (goals 1 and 2);
2. Ensure EMSC activities, planning, coordination: Attempt to secure State funding for EMSC and maintain a strong working relationship with community groups and professional organizations (goal 3);
3. Improve EMSC in prehospital care: Upgrade EMT training at all levels and provide training for instructors to disseminate training (goal 4);
4. Improve EMSC in hospital care: Provide training to hospital-based providers, nurses, and physicians through special nursing courses and PALS courses, and develop specific emergency departments approved for pediatrics criteria for Oklahoma (goal 4);
5. Shaken Baby Syndrome: Continue to distribute the videotape entitled *When Your Baby Cries*, begin a study in conjunction with Indian Health Service hospitals, and produce a new videotape for Hispanic communities; and

6. Coordination: This project continues to work closely with the Oklahoma State Department of Health, Emergency Medical Services Division; the U.S. Department of Health and Human Services, Indian Health Service; several tribal governments; Oklahoma University College of Nursing; Oklahoma State Department of Vocational Education; American Academy of Pediatrics; Oklahoma EMT Association; and Emergency Nurses Association.

EVALUATION: The evaluation of this project will be measured ultimately by the reduction of negative outcomes of pediatric emergencies. Tracking methods include meeting minutes and notes, course attendance records, data collected, and products generated. Each must correlate with the appropriate objectives for measurement of completion.

EXPERIENCE TO DATE: Our most successful activities have been related to EMT training, from course changes to instructor training. Nurse and physician training has been difficult due to issues related to obtaining PALS directorship and designating a nursing course. Data collection has been difficult due to the establishment of data sets and the training required to collect the data correctly.

Accomplishments include modification of the U.S. Department of Transportation's *EMT—A National Standard Curriculum* (December 1992); *Pediatric Minimum Ambulance Equipment List* (December 1992); and the videotape *When Your Baby Cries* (March 1993).

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EMSC
MCH-444001
10/01/93-09/30/95
Project Director(s):
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PROBLEM: Although 1,617 children were hospitalized because of injuries in Rhode Island during 1990, current instructional programs for emergency medical technicians (EMTs) in Rhode Island are oriented toward the needs of adult patients, and do not address the significant physiologic and emotional differences involved in treating critically ill or injured children.

Children and families with limited English proficiency are particularly vulnerable to medical emergencies as a result of language and cultural barriers and unfamiliarity with the health care delivery system. The 1990 census identified Southeast Asian and Latino residents as the fastest growing population groups in the State. These families are likely to experience difficulties in identifying emergency situations, providing basic first aid until rescue personnel arrive, and accessing timely and appropriate care for injured or critically ill children because existing injury prevention and health promotion initiatives are geared to the needs of English-speaking families.

To improve the quality of care for all injured children in Rhode Island, new pediatric care protocols must be implemented for all levels of practice in emergency medical services (EMS). In addition, efforts must be undertaken to expand coverage of pediatric emergencies in basic EMT training courses at each level of practice and to increase opportunities for continuing education in the management of pediatric emergencies.

GOALS AND OBJECTIVES: The Department of Health proposes to increase the years of healthy life for Rhode Island's children by developing a comprehensive education and training program to improve the capabilities of EMS providers and expand childhood injury prevention efforts. In particular, the Department of Health will seek to achieve two principal goals: (1) Providing training to EMS personnel that is specifically tailored to the needs of children, and (2) developing culturally sensitive parent education materials tailored to the needs of Southeast Asian and Latino families.

METHODOLOGY: Project activities include the following:

1. EMT training: The Department of Health's emergency medical services for children (EMSC) initiative will provide expanded training to more than 1,000 EMTs in the treatment of pediatric injuries statewide through a combination of new educational programs. Training courses for basic level (EMT-A) and intermediate level (EMT-C) prehospital personnel will be augmented to include a significant pediatric component; since these changes will be included as part of the basic curriculum for both programs in subsequent years, expanded pediatric training will ultimately become available to the majority of the State's prehospital providers through basic instruction or continuing education programs. In addition, during project years 1 and 2, the Department of Health will offer Basic Trauma Life Support (BTLS) and Pediatric Advanced Life Support (PALS) courses throughout the State, as well as seminars on pediatric injuries.

   Materials developed by other EMSC grantees (New Mexico, New York, and Vermont) will be incorporated into the Department of Health's EMT pediatric training programs, along with existing curriculums from the American Heart Association's PALS course and the American College of Emergency Physicians' BTLS program. Prior to training, the EMS training coordinator and the medical consultant to the Division of Emergency Medical Services will review the Department of Health's

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recently revised pediatric care protocols and expand the coverage of pediatric emergencies in the State's basic and cardiac training programs for prehospital personnel.

2. Parent education: Materials developed by other EMSC grantees (Oregon and Florida) will be evaluated for their appropriateness for Latino and Southeast Asian audiences. Community agencies will assist in identifying members of the Southeast Asian and Latino communities in Rhode Island to be trained as parent educators.

The first-year budget ($248,754) will fund three new staff positions in the Division of Emergency Medical Services, to manage and implement program goals, establish contracts with one or more community agencies to conduct parent education sessions, and retain the services of translators to help create educational materials in several languages (including Cambodian, Hmong, Lao, Thai, and Vietnamese). In addition, the Department of Health will contract with the American Heart Association to conduct a series of Pediatric Advanced Life Support courses for EMS personnel throughout the State. Sufficient funds are also budgeted for required travel, training equipment, supplies, and indirect costs associated with project activities.

The project will be administered by Peter Leary, Chief of Emergency Medical Services, with support from the Department of Health's Injury Prevention Program and the Trauma Care Systems Project. Implementation of this project will significantly improve delivery of emergency medical services for the State's children by expanding educational opportunities for providers and parents.

EVALUATION: Project evaluation will include two components:

1. EMT training programs will be evaluated by a comparison of the adequacy of prehospital care for pediatric patients before and after completion of training programs. In addition, each training course will include a written pretest and written and practical skills tests to measure the effectiveness of the Department of Health's expanded pediatric training activities.
2. Community agencies that contract with the Department of Health to provide parent education courses for populations with limited English proficiency will administer standardized pretests and posttests to all participants.

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EMSC
MCH-464001
10/01/93-09/30/95
Project Director(s):
Stephen R. Karl, M.D.

PROBLEM: South Dakota is a large, sparsely populated State with three distinct populations. There are few pediatric specialists and no specific pediatric provisions in the existing emergency medical services (EMS) system. The childhood death and injury rates in the State exceed those of the United States as a whole.

GOALS AND OBJECTIVES: The project has established the following goals:

1. The pediatric capabilities of the current EMS system will be determined;
2. Services provided to acutely ill and injured children and their outcome will be evaluated;
3. Broad-based education programs will target prehospital and inhospital providers; and
4. An aggressive public information and education effort will focus on injury prevention and access to emergency medical services.

METHODOLOGY: The project will carry out the following activities:

1. Equipment and training resources of ambulance services and emergency rooms will be evaluated by questionnaire;
2. All ambulance run forms for pediatric patients will be monitored;
3. Five sentinel illnesses/injuries will be chosen and followed in the four major hospitals in the State;
4. All pediatric admissions to the two trauma programs will be identified and followed, using their trauma registries;
5. Emergency medical technicians will receive training in an appropriate pediatric course;
6. Paramedics and physicians will be offered the Pediatric Advanced Life Support (PALS) course;
7. The Pediatric Emergency Nursing Instructor Program will be brought to the pediatric, critical care, and emergency nurses;
8. The Planning to Avoid Childhood Emergencies course will be taught by local ambulance services;
9. Bicycle helmet use will be evaluated;
10. A head injury prevention program stressing bicycle helmet use will be held; and
11. Public information will be provided for all regions, explaining how to access the EMS system.

EVALUATION: Equipment and training resources of ambulance services and emergency rooms will be evaluated by questionnaire at the end of each year to monitor progress. By the end of the first year, all ambulance services will be offered at least one course in pediatric emergencies. The Advanced Pediatric Life Support course and Pediatric Emergency Nursing Instructor Program will be evaluated through course attendance.

All patient-related data will be analyzed for trends, and all pediatric deaths in the State will be evaluated. Bicycle helmet use will be monitored for increased compliance.

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EMSC
MCJ-484001
10/01/91-09/30/94
Project Director(s):
Rhonda Blackmore

PROBLEM: Prior to the advent of emergency medical services for children (EMSC) in Texas, there had been a lack of focus at the State level on providing pediatric emergency services. Despite the milestones already achieved, the increasing population and sheer size of the State pose unique challenges in implementing the EMSC program.

GOALS AND OBJECTIVES: The major goals and objectives of this program are to:

1. Increase the level of knowledge of pediatric emergency response among emergency medical services (EMS) providers and rural physicians and nurses;
2. Integrate a pediatric component into the planning and implementation of the statewide EMS/trauma system;
3. Build pediatric data collection and analysis components into the EMS/trauma registry; and
4. Develop public education materials on prevention of injury and illness, and on appropriate access to and use of the EMS/trauma system.

METHODOLOGY: Project activities include the following:

1. Training: This goal will be accomplished by providing pediatric emergency care classes and continuing education courses for EMS personnel, nurses, and physicians, targeting the rural areas. The project will also provide pediatric internships, continuing education through interactive software, and satellite outreach education.
2. Systems integration: A pediatric component will be integrated within the statewide EMS/trauma system through the use of model pediatric treatment, and criteria and guidelines for the triage, transport, and transfer of patients. This component will be implemented through the Trauma Systems Development Program. Introduction of hospital designation guidelines will be included to regionalize the system.
3. Pediatric registry: This goal will be accomplished by incorporating a pediatric data set into the existing EMS/trauma registry and analyzing an aggregate of data collected from major EMS providers throughout the State. Results will be used to target high-need areas in ongoing injury prevention activities.
4. Public education: The public information and education component has targeted an education campaign directed to emergency providers concerning childhood poisonings and other high-incidence injuries. An injury prevention component has been incorporated into the EMS Management Academy.
5. Coordination: All training programs have been incorporated into the EMS Systems Development Mobile Training Unit. All system integration components have been coordinated with the Trauma Systems Development Program. All public education programs are coordinated with either the Public Information and Education Program or the Public Health Promotions Division of the Bureau of Emergency Management. The EMSC project works closely with TEMSAFE (a coalition of three basic-level EMS courses for training areas) through the University of Texas to assure adequate rural outreach. The EMSC program has assisted three emergency medical technician/paramedic programs,

incorporating the EMSC program into the initial training of paramedics in Texas. Coalitions among hospitals, flight services, and local EMS fire departments have also been developed in three major metropolitan areas to ensure continued availability of the Prehospital Provider Pediatrics Course.

During the third year of the grant period, all pediatric activities will be fully integrated into the EMS Systems Development Program or the Trauma Systems Development Program (as appropriate) through the following: Continuing education materials for medical providers; a prehospital preceptorship; interactive training software; satellite broadcasting of pediatric care issues; and an injury prevention training curriculum.

EVALUATION: Student and instructor critique forms will be the major tool for evaluating the training goals. These forms will be used for all courses, the internship program, and the continuing education satellite transmissions and interactive software. Evaluation of systems integration will be self-documented, through the appearance of the pediatric components in the Texas Trauma System Manual and in the regional EMS/trauma system plans. Data collection will be evaluated based on the effectiveness of integrating a pediatric data set in planning for the EMS/trauma registry and the effectiveness of the data in targeting intervention strategies. The public information and education campaigns will be evaluated by monitoring the volume of materials requested.

Data points established for the EMS/trauma registry will be tested for validity and will act as the ongoing monitor of the effect of treatment protocols and regionalization criteria as well as of the effect of injury prevention activities.

EXPERIENCE TO DATE: Thirty-six sessions of the Prehospital Provider Pediatric Course have been held; more than 700 individuals have participated in these sessions, coordinated by the EMSC program. The pediatric preceptorship has been piloted in two children's hospitals. A manual has been developed that includes guidelines for the student and preceptor and problem-based learning scenarios. Educational software, based on the prehospital curriculum and learning-based scenarios, is also available. Six sessions of the Pediatric Advanced Life Support courses have been held. The first sessions of the Emergency Nurses Association's Emergency Nursing Pediatric Course are being promoted in Texas—in part by funding through contracts with the program. Five broadcasts have been completed through HealthNet via satellite.

Additional project accomplishments include the following: Hospital designation criteria have been developed; a study of feeder facilities has been completed to identify patterns of patient routing; a data set of more than 50,000 individual patient records from EMS providers is being analyzed for injury and illness patterns; a poison education kit is being developed and implemented; and a resource book of ongoing injury prevention activities among EMS providers will be completed. In addition, an internship has been developed for master's candidates in public health administration to allow these students to participate in and contribute to the ongoing activities of the EMSC program.

Emergency Medical Services for Children
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EMSC
MCJ-494001
10/01/90-09/30/94
Project Director(s):
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PROBLEM: The purpose of this program is to enhance existing emergency medical services for children (EMSC) capabilities to reduce mortality and morbidity from injuries and critical illnesses in infants and children. This project is regional in scope, involving Utah, Idaho, Wyoming, Montana, Nevada, Oregon, Washington, Colorado, Arizona, and New Mexico. A major focus of this grant is the development of the Intermountain Regional EMSC Coordinating Council, with the hope that it will become a permanent regional EMSC organization.

There are four major problem areas within EMSC in Utah:

1. Precise definition of medical problems facing the emergency medical services (EMS) community is impossible because of a paucity of good data. This prevents accurate evaluation of the efficacy of any interventions to modify the EMS system.
2. Nineteen percent of Native American deaths occur in individuals under 24 years of age, compared to 6 percent of deaths occurring in the same age group in the remaining U.S. population. Delays in accessing EMS systems for serious infections and trauma may contribute to the discrepancy in age-specific mortality rates in Native American children. Factors that may contribute to these delays in receiving appropriate care are: (1) Lack of recognition of and appropriate parental responses to serious childhood injuries and illnesses; (2) poor transportation and long distances from EMS sites; and (3) lack of adequate training in pediatric emergency care among local health care personnel who serve these children.
3. Tertiary pediatric facilities are limited in the intermountain region. As a result, the region is heavily dependent on critical care air transport systems to transport patients to appropriate facilities capable of providing definitive care.
4. Numerous EMS entities have developed courses and protocols for training prehospital personnel in the care of the pediatric patient. This results in conflict and confusion about the appropriate course or protocol to be followed.

GOALS AND OBJECTIVES: The overall goals of the Utah EMSC program follow:

1. Develop a comprehensive intermountain pediatric emergency medical services data base. A comprehensive EMSC data base has been established. The long-term goal is to establish this surveillance system as a permanent part of the EMSC operations within the region. The short-term goals are to (1) fully automate data collection in Utah, (2) analyze the incoming data to provide future project direction, and (3) implement an effective data collection mechanism for followup and outcome data.
2. Reduce the morbidity and mortality of Native American children in the region. The long-term objective is to reduce morbidity and mortality from injuries and acute severe illness by (1) developing new parent education strategies, (2) identifying and improving deficits in pediatric EMS equipment and skills, and (3) facilitating program development strategies by providing improved data collection and analysis.
3. Educate emergency care providers within the region about the capabilities, availability, and response times of existing intermountain regional air transport systems.
4. Establish consistent protocols and educational programs for EMSC throughout the intermountain region.

METHODOLOGY: Project activities consist of the following:

1. Data base development: The data base currently consists of an automated EMSC prehospital incident data file and emergency department log data. Data collection software has been distributed to all Utah facilities and to all States in the Intermountain Regional EMSC Coordinating Council. Wyoming will begin using this software in year 3, and other States are expected to use the system in the future.
2. Reducing morbidity and mortality rates: A health education calendar, *Two Worlds: A 1991 Calendar and Health Guide for Parents,* was designed to be a culturally acceptable health resource for parents to display in the home, providing quick reference and repeated exposure to basic health information. *Two Worlds: A 1992 Calendar and Health Guide for Parents* was modified to reflect information gained from the year 1 calendar. In year 3, we plan to (1) expand the target population to other high-risk groups, (2) conduct ongoing evaluations of the calendar's effectiveness, (3) modify the format to increase the educational impact as guided by the evaluation data, (4) streamline calendar production to decrease costs involved, and (5) secure ongoing funding for future calendar production.
3. Increasing availability and accessibility of hospitals: Survey instruments have been distributed to determine current resources (hardware, equipment, and personnel) available within the air transport systems in the region, and compilation of the resulting data is underway. Following compilation, these findings will be distributed to all emergency care providers in the region. Meetings involving representatives of each service will strive to achieve better integration and coordination of the pediatric air transport agencies in the region.
4. Improving consistency of protocols for EMS: Under the direction of Intermountain Regional EMSC Coordinating Council, a uniform base of prehospital protocols and educational programs can be planned across State and jurisdictional boundaries. This will permit the most economical delivery of those programs to the prehospital personnel. The Washington State EMSC curriculum has been used in Utah, Wyoming, Montana, and Nevada. We plan to develop six quality instructional packages of videotapes and workbooks, incorporating material from significant lectures of the Washington State EMSC course. This will allow providers to view the videotapes privately and use human instructors for the hands-on practical sessions. Pediatric curricular materials are also being distributed to emergency department nurses throughout the region.

EVALUATION: Project evaluation focuses on the following components:

1. Data base development: Data are currently being collected in Utah, and software is being installed in Wyoming. Project staff are providing assistance to agencies as this software is installed in the region.
2. Education of Native American parents: In year 1, the calendar was distributed to 200 Native American families. Monthly tests, containing questions on each month's topic, were administered to measure the effectiveness of the calendar's educational content. Test results showed a significant increase in parental knowledge in eight specific areas, and home visits revealed that 40 of 41 families (97.5 percent) were using the calendars 7 to 8 months after distribution.
3. Critical care transport systems: Following distribution of information on pediatric air transport capabilities in the region, response times will be evaluated, using the comprehensive EMSC data base, to determine subsequent reductions in delays to definitive therapy.
4. Development of consistent protocols: To evaluate the methodology, both pretests and posttests will be administered to participating prehospital personnel.

EXPERIENCE TO DATE: The project has accomplished the following activities:

1. Data base development: In Utah, the Bureau of Emergency Medical Services is empowered to establish an EMS data system. For 18 years, this system has consisted of a hard-copy incident report completed for each patient seen in the field by emergency medical technicians and/or paramedics, and an emergency department log. To date, 47 prehospital care provider agencies are submitting data electronically, and an additional 40 provider agencies have received copies of the software. Of Utah's 41 hospitals, 3 hospital emergency departments have submitted electronic data, 5 other hospitals are beginning data collection, and the remaining Utah hospitals are expected to come online in the future.

The data collection software has been completely rewritten to make it easier to use and to provide better local reporting. This software has been distributed throughout the region and is being used currently for data collection in Utah. Software "bugs" (or "features") are being noted and will be corrected in future releases.

2. Reduction of Native American morbidity and mortality: The 1991 calendar received the 1991 Healthy Traditions Award for Health Education Materials from the American Indian Health Care Association, and the 1992 calendar has been nominated for two such awards. The calendars were so well received that 6,300 of the 1992 calendars have been distributed to more than 125 individuals and/or agencies. New calendars will be available in year 3.

3. Critical care air transport systems: Data are currently available on 1,000 pediatric transports between 1988 and 1991. All Utah air agencies have agreed to provide data about pediatric transports. This data collection will be automated after other components of the data surveillance system are in place.

4. EMSC protocols: The project has conducted numerous educational activities, including (1) two EMSC instructor courses in Utah, two planned for Wyoming, one conducted in Montana, and two planned for Nevada; (2) modification of course materials where appropriate; (3) development of the instructional packages using these course materials; and (4) development, adoption, and initiation of the pediatric vascular access curriculum. More than 2,000 emergency care providers have participated in EMSC training conducted by EMSC staff. The Intermountain Regional EMSC Coordinating Council committee has coalesced into a cohesive, cooperative group representing seven States, and may grow to nine with the possible addition of New Mexico and Arizona. The main focus of these meetings is to share each State's new training interventions and avoid the cost of duplicating these efforts. We anticipate that this group will become a permanent regional EMSC structure.

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EMSC
MCH-544001
10/01/92–09/30/94
Project Director(s):
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PROBLEM: This project is a joint effort of Kentucky and West Virginia (with assistance from Ohio) to address provision of emergency medical services for children (EMSC) in an isolated rural environment. Geographic isolation due to terrain and weather, poor socioeconomic status, and high patient-physician ratios only exacerbate the special problems of the unique population and culture of Appalachia. We are assessing the current status of our EMSC system and addressing barriers to the delivery of consistent, high quality emergency medical care for children in rural Appalachia.

GOALS AND OBJECTIVES: The project has established the following goals:

1. A Tri-State Appalachian Alliance has been formed to investigate the special problems of providing emergency medical services for children in rural Appalachia.
2. A collaborative rural EMSC training and continuing education curriculum is being developed through consensus among the three States. Linkage with local hospital emergency departments and referral centers will be established.
3. Pediatric health care providers are being introduced into the emergency medical services (EMS) system as advisors.
4. The project will build community expertise in emergency medical services for children at the county level to help lay the foundation for sustainable development. Local EMSC resource personnel are being trained as instructors to help meet local educational needs and improve accessibility.
5. The project will channel community energy into primary intervention programs.
6. Special needs of rural children with special health needs are being addressed through a pilot medical passport program.

METHODOLOGY: The project has initiated the following activities:

The Appalachian Alliance for Emergency Medical Services for Children consists of triads (representing various government agencies and health and service organizations within each of the three States) with a common concern for children in the EMS system. These triads have met to establish communication patterns, and each triad will subsequently send one representative to EMSC meetings with a summary of collective information and recommendations. This enables a large number of resource persons to learn about pertinent EMSC issues and provide information and recommendations without becoming overwhelmed with attending geographically distant meetings.

Epidemiologic studies are being conducted to help determine the needs of the EMSC system. These include sentinel case studies (reviews of significant pediatric EMS and emergency department cases) and a study of 100 representative locations in West Virginia to evaluate base knowledge of EMSC and resources available within these communities. In addition, needs assessment surveys are being performed in selected areas and statistics from pediatric emergency department admissions are being compiled.

Consensus guidelines on EMSC training and continuing medical education are being developed at several levels, ranging from involvement of local squads in the focus group process to various government and provider triads. The community development effort will involve the Centers for Disease Control and

Prevention Planned Approach to Community Health methodology. The Ohio EMSC project team has participated in transferring relevant techniques and methods developed through their project. The focus group and nominal group processes, designed to foster community involvement, have been used with initial success.

In additional, State pediatric advisory committees are being formed, and the medical passport system will be investigated in the Appalachian setting.

The project works with State health agencies (including EMS, maternal and child health, and children with special health needs) in West Virginia, Kentucky, and Ohio to help coordinate communication among these offices in the tristate region. At the local level, pediatric injury prevention education is promoted by approaching the local county health departments to establish access to the community health network. The process is initiated through community focus groups to determine needs and foster interest in childhood injury prevention.

EVALUATION: Baseline data are being gathered initially in the following areas: Status of the local EMS system; training of emergency medical technicians; staffing of emergency departments; pediatric EMS equipment; linkages of the emergency medical services system, emergency departments, and referral centers; public information and education; and safety programs. These components will be monitored and reassessed periodically, including at the end of the project, with special attention to their capability to sustain advances. The Ohio project team will participate in the evaluation.

The efficacy of the triads and the pediatric advisory committees will be evaluated by monitoring the institution of categorization and/or minimum standards and training policies in the region. The efficacy of the training programs will be analyzed by comparing standard pretests and posttests for the courses. Differences in outcome from the epidemiologic studies (repeated in year 2, after instituting community-based training) will also be used to evaluate the training. The medical passport system for children with special health needs will be evaluated by determining the parents' perceptions of ease of access to the EMSC system.

EXPERIENCE TO DATE: The triad concept has been introduced to State officials at an initial meeting. Action groups are being established to address issues of region-specific criteria for pediatric prehospital training and resources, and emergency department standards. These groups will come from government triads and pediatric advisory committees. Each EMS regional policy committee in West Virginia now has a pediatric member or consultant who serves on a newly formed State pediatric advisory committee.

The steering committee for the project has selected the North Carolina EMSC project's prehospital training curriculum as a basis for EMSC training in local communities. A curriculum is being developed for externships at pediatric tertiary care centers for nurses and emergency medical technicians/paramedics. Community and EMS focus groups have been held in several areas to begin local initiatives. These focus groups have identified child abuse and insufficient parenting skills as areas of major concern, in addition to the previously identified problem areas.

TARGETED ISSUE GRANTS

Outcome Evaluation of Emergency Medical Services for Children

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EMSC
MCH-054002
10/01/93–09/30/95
Project Director(s):
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PROBLEM: The mission of the Outcome Evaluation in Emergency Medical Services for Children (EMSC) project is to promulgate comprehensive systems of care that reduce the morbidity and mortality of child emergencies. Evaluation of the effectiveness of new programs, however, is hampered by several problems. First, death is a relatively low frequency event occurring in only 5–10 percent of the group at highest risk (pediatric intensive care unit admissions). As a result, a very large number of cases is needed in order to demonstrate a reduction in mortality related to system change. Second, morbidity is also an important outcome. Unfortunately, no suitable instrument is presently available for measuring morbidity in this setting.

An additional problem is that, despite an EMSC programmatic priority to evaluate "strategies to reduce the emotional toll of pediatric emergencies," the frequency, nature, or severity of the emotional toll and the subgroups that may be at risk for these problems have not been well established.

GOALS AND OBJECTIVES: The project has identified the following goals and related objectives to be completed during the 2-year project period.

Goal 1: The primary goal of our project is the validation of scales to measure cognitive and physical morbidity.

Objectives:

a. Our primary objective will be to determine whether the Pediatric Overall Performance Category (POPC) and Pediatric Cerebral Performance Category (PCPC) scales differentiate between children of varying cognitive and general adaptive functional abilities. To do so, we will test four hypotheses to determine the relationship between POPC and PCPC scores and other standardized instruments that measure the same constructs.

b. Secondarily, we will evaluate a number of additional measures of cognitive and general adaptive function for children in each POPC and PCPC outcome category.

c. We will evaluate the agreement between clinician and maternal ratings of PCPC and POPC.

d. We will assess the longitudinal stability over 6 months of POPC and PCPC ratings and other measures of physical/adaptive function and psychosocial adjustment.

Goal 2: A secondary goal is to investigate the nature, severity, and predictors of poor psychosocial adjustment following child emergencies.

Objectives:

a. We will assess child emergency outcomes in the following additional domains: Child behavior/adjustment, maternal psychosocial adjustment, child behavior, and family stress.

b. We will perform exploratory analyses to identify predictors of poor psychosocial adjustment.

METHODOLOGY: Investigators in the Pediatrics Department of the University of Arkansas for Medical Sciences plan an observational study including both cross-sectional analysis and prospective followup of a cohort of 200 patients discharged from the pediatric intensive care unit. The cohort will be accumulated

consecutively over a 12-month enrollment period to a maximum of 25 patients in each of the 8 cells of the study. These eight cells are defined by the patient's age (under 42 months, or 42 months to 21 years) and hospital discharge PCPC score (1, 2, 3, or 4). Multiple measures of cognitive and physical function and psychosocial adjustment will be assessed at the time of hospital discharge, and again at 1 month and 6 months following discharge. Data will be summarized descriptively, then statistical procedures will be employed for hypothesis testing. Finally, exploratory analyses will be performed to identify predictors of outcome in the psychosocial domains.

Because of the research nature of the project, there will be no direct impact on State agencies or service areas. However, the directors of the following State agencies will receive copies of our quarterly report in order to apprise them of our progress: State Office of Emergency Medical Services, State Department of Health, and State Highway and Transportation Department.

EVALUATION: All objectives for the study will be completed during the 2-year project period. Progress in accomplishing objectives will be monitored and reported against quarterly interim milestones for numbers of patients enrolled and evaluated.

Emergency Medical Services for Children
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EMSC
MCJ-064002
10/01/91–02/28/94
Project Director(s):
Maureen McNeil

PROBLEM: The California Emergency Medical Services for Children (EMSC) project is a targeted issues project. Its focus is statewide improvement of the pediatric capabilities of local and regional emergency and critical care systems. There is well-documented evidence of major deficiencies among local emergency medical services (EMS) agencies in EMSC planning, personnel training, equipment, emergency department preparedness, access to pediatric critical care and trauma services, rehabilitation, and management of data.

GOALS AND OBJECTIVES: The project has established specific goals and objectives along with specific timelines. The overall project goals are to create a viable "continuum" model for emergency medical services for children, to be carried out in local EMS agencies throughout California. This service continuum includes community medical operations for children, ranging from injury prevention and prehospital care to emergency department and critical care, trauma services, and rehabilitation. The model also includes administrative components to coordinate and manage this continuum, including appropriate use of data and prospective planning strategies.

METHODOLOGY: The project involves product development by 10 subcommittees. Each subcommittee will focus on 1 of 10 selected components of the EMSC continuum model. These components are the major clinical and administrative elements necessary for successful planning and management of EMSC subsystems at local and regional levels. The subcommittees include (1) systems management, (2) injury prevention, (3) prehospital care, (4) paramedic training, (5) emergency departments, (6) interfacility transport and critical care services, (7) pediatric trauma, (8) rehabilitation, (9) information management, and (10) emergency medical services for adolescents at risk for HIV infection.

The process of implementing EMSC products involves the following: First, specific product development by multidisciplinary project committees appointed by the California Emergency Medical Services Authority, from recommendations by the EMSC project staff; second, a four-stage process for consensus building and individual product peer review; third, modification of products after statewide review; and fourth, a systems approach to product implementation and programmatic development, using multiple strategies.

The California Pediatric Emergency and Critical Care Coalition, a preexisting consortium of California organizations and agencies involved in children's health care, has been restructured to provide broad-based consultation to the project and the subcommittees. The coalition's role will include a strong steering committee advisory relationship to the project staff, and activities to foster public and professional education about the objectives and products of the EMSC project.

EVALUATION: The effect of project activities on local EMS systems in California will be monitored in several ways, primarily through the extensiveness of product implementation. The California Emergency Medical Services Authority will survey all State EMS agencies to assess preproject levels of EMSC development, and will continue to monitor local product development during the project period.

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EXPERIENCE TO DATE: The California EMSC project has appointed 13 active committees or task forces. The project has identified committee chairpersons, multidisciplinary memberships, objectives, methodologies, timelines, and meeting dates for each of these committees. In addition, staff have begun to publicize the project and disseminate information through conferences and press releases.

Evaluation of California Emergency Medical Services for Children Model

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EMSC
MCH-064005
10/01/93–09/30/95
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PROBLEM: The Federal Emergency Medical Services for Children (EMSC) program has brought powerful visibility to issues in pediatric emergency and critical care, and has helped create numerous State and local programs aimed at prevention and management of acute childhood illness and injury. In California, the work of the original EMSC demonstration project and the 1991–93 targeted issues project have laid a broad and sturdy foundation for widespread implementation within local emergency medical services (EMS) systems. The 1991–93 targeted issues project established a comprehensive model for an integrated pediatric emergency and critical care continuum—from prevention through treatment, specialized care, and rehabilitation.

While the California EMSC model provides a clear set of guidelines for clinical and operational elements that are essential to implement emergency medical services for children, there is no objective evaluation component to gauge the cost or effectiveness of these services. No EMSC project has yet provided such analysis. Key ingredients are missing in an evolving concept of emergency medical services for children at local, State, and national levels. Therefore, pediatric emergency and critical care systems face a growing imperative to integrate objective system evaluation with system planning, implementation, and management in order to justify public expenditures and validate EMSC guidelines.

GOALS AND OBJECTIVES: The first goal of this project is to monitor and evaluate the California EMSC model in two EMS systems (one urban, one rural) in order to analyze the administrative and program costs of implementing the model. We will provide funding from the Preventive Health and Health Services Block Grant to two local EMS agencies (California's equivalent of EMS regions). These agencies will implement pediatric subsystems, based on the California EMSC model. During this phase, we will analyze the administrative costs of implementing the model (including planning, implementation, and monitoring of the pediatric subsystem) and the program costs (including both one-time expenses and ongoing costs).

The second goal is to identify political, technological, legal, and financial barriers to implementation of the California EMSC model. We will accomplish this by monitoring and evaluating the implementation process and through interviews with system participants.

The third goal is to promote statewide acceptance of the California EMSC model. We will survey EMS system lead agencies regarding the current status of pediatric subsystem development. We will also conduct consultation visits to each of the State's 32 EMS system lead agencies to obtain feedback on the content of the California EMSC model and to determine feasibility of implementation. This will culminate with a training session for EMS system lead agency staff on implementing the California model.

The final goal is to revise the California EMSC model and to distribute it nationally. We will base the revisions on the lessons learned from the two grantee agencies and from the survey and consultation visits. We will distribute the final products nationally and will present them to an appropriate national audience.

METHODOLOGY: Our major activity will be to provide grant funds to two local EMS agencies and to conduct a real-time evaluation of their implementation process. We will receive and analyze the data that the agencies have agreed to submit and will meet monthly with agency staff. Reports will be issued on costs and barriers to implementation.

In addition, we will use a statewide survey and consultation visits to identify implementation barriers and to promote implementation of the model. We will conduct a training session in cooperation with the Emergency Medical Services Administrators Association of California and the Emergency Medical Directors Association of California. In each State, we will use information from the National EMSC Innovation Bank and consult with the National EMSC Resource Alliance.

The California Emergency Medical Services Authority is the lead State agency for EMS. We will provide Preventive Health and Health Services Block Grant funds to two local EMS agencies and will coordinate with these agencies through the grant process We will have direct contact with each of the local EMS agencies in the State. Additional coordination will result from continued use of the California Pediatric Emergency and Critical Care Coalition and Project Steering Committee which were instrumental in the development of earlier EMSC products.

EVALUATION: Specific tracking techniques for each stage of the methodology include contracts between the California Emergency Medical Services Authority and the two grantee agencies; submission of required reports; completion of site visits, interviews, and the training session; and issuance of final reports for each objective and for a revised California EMSC model.

Prospective Randomized Study of the Effect of Prehospital Pediatric Intubation on Outcome

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EMSC
MCH-064004
10/01/93–09/30/95
Project Director(s):
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PROBLEM: Management of the airway, including controlling secretions and providing oxygenation and ventilation (or hyperventilation), is a vital part of the prehospital care of the critically ill or injured pediatric patient. Many prehospital providers feel that the only way to manage the pediatric patient's airway is through placement of an endotracheal tube. Pediatric intubation, therefore, is rapidly becoming part of the scope of practice of paramedic providers across the country. Unfortunately, this standard is developing without conclusive evidence that intubation is beneficial to patients in the prehospital setting. In fact, data suggest that the complication rate is 9–40 percent, which may be too high to justify its prehospital use.

Retrospective studies of prehospital pediatric intubation have failed to include important components of the study design, such as (1) inclusion of a control group for comparison with the intubation group, (2) well-defined indications for intubation, (3) well-defined patient outcomes, and (4) adequate sample size. Because the survival rate from pediatric cardiopulmonary arrest is so low (3–15 percent), 800 pediatric patients would be needed to reliably demonstrate a clinically important increase in survival rate with the use of prehospital pediatric intubation. Previous studies have included no more than 100 patients. In order to conduct an optimal study of the effect of prehospital pediatric intubation on patient outcome, a large, well-organized emergency medical services (EMS) system and a prospective randomized study design are needed. The EMS system(s) must have the capability to determine the success and complication rates of prehospital pediatric airway management techniques and to follow these patients to hospital discharge (or death).

GOALS AND OBJECTIVES: The Research and Education Institute of Harbor-UCLA Medical Center, located on the southern campus of the UCLA School of Medicine, is collaborating with the Los Angeles County EMS agency and the Orange County EMS agency to plan a project that remedies the inadequacies of previous investigations. Following are the major goals for this study:

1. Educate all paramedics in Los Angeles and Orange Counties in pediatric endotracheal intubation;
2. Upgrade previously attained pediatric airway management skills including bag-valve-mask ventilation, obstructed airway management, and trauma airway management;
3. Evaluate the success and complication rates of pediatric intubation by paramedics;
4. Evaluate the efficacy of the treatments (bag-valve-mask ventilation alone versus bag-valve-mask ventilation followed by endotracheal intubation) in the prehospital airway management of pediatric patients;
5. Determine the duration of time that paramedics retain an adequate skill level after being trained in bag-valve-mask ventilation and intubation;
6. Estimate the system and provider agency cost of the additional training;
7. Estimate the cost-per-life-saved of including pediatric intubation within the paramedic's scope of practice; and
8. Establish a large, urban EMS research coalition.

METHODOLOGY: Nurse educators supervised by the staff of the Los Angeles County EMS agency's Paramedic Training Institute and the Education Management Subcommittee of this project will educate

nearly 2,800 paramedics in both Los Angeles and Orange Counties in advanced pediatric airway management. This education will consist of didactic (including videotape), interactive, and mannequin training sessions for a total of 7 hours. Once these prehospital providers have completed this additional education, the success rate, complication rate, and effect on outcome of prehospital pediatric intubation will be evaluated. Indications for prehospital airway management for pediatric patients in this project include (1) traumatic full arrest, (2) head trauma with altered mental status, (3) respiratory distress with a rate of greater than 60 respirations per minute and altered mental status, (4) respiratory arrest, (5) severe respiratory depression with altered mental status, (6) complete airway obstruction, and (7) medical cardiopulmonary arrest.

In Los Angeles and Orange Counties, the current standard of therapy for patients under 12 years of age or 40 kg by weight who need prehospital airway management is bag-valve-mask ventilation. Pediatric patients (as defined in this project) will be randomized by calendar day to one of two prehospital airway management strategies. On odd calendar days, patients will be managed with bag-valve-mask ventilation alone; on even days, patients will be managed using bag-valve-mask followed by pediatric endotracheal intubation.

Initial data on study patients and their prehospital management will be obtained by paramedics caring for the patients. Collection of data and completion of data collection forms will not interfere with the medical care of the patients. Followup data on complications and outcome will be obtained by project investigators. Retention of airway management skills will be evaluated by assessing the skill proficiency of a subset of paramedics every 6 months throughout the project. Cost analysis of education and skills maintenance will be performed by collecting data on provider agency costs of training each paramedic.

Project investigators are collaborating with existing EMS agencies in Los Angeles and Orange Counties to implement this project. Four major committees will coordinate the project: (1) The Steering Committee—with representation from pediatric emergency medicine experts, local EMS agency personnel, and paramedic providers—will oversee all aspects of the project from design through implementation; (2) the Education Committee will oversee development and implementation of the paramedic educational curriculums; (3) the Data Management Committee will supervise the data collection and analysis for the project; and (4) the Implementation Management Committee will be responsible for disseminating all information to EMS provider agencies, EMS providers, and other project committees, and for preparing correspondence and reports.

EVALUATION: The responsibility for evaluating this project will rest with the Data Management Committee. This committee will meet periodically to review the accumulating data, analyzing them for evidence of (1) effect of treatment group (bag-valve-mask versus bag-valve-mask followed by endotracheal intubation) on outcome, or (2) unacceptable complication rate. If one therapy is found to be superior to the other during these reviews, the randomization and enrollment of patients will be halted.

Descriptive analyses will be performed on demographic variables, and on variables related to paramedic performance (success and complication rates of airway management), retention of skills, and the overall system cost and individual provider agency cost of the additional pediatric airway management education (including endotracheal intubation). Logistic regression will be used to analyze the effect of management strategy on patient outcome, while adjusting for the effects of other clinical variables that also affect outcome (e.g., age, cause of respiratory failure).

Finally, this study is likely to be the only controlled study of its kind and will have tremendous impact on pediatric emergency care for Los Angeles and Orange Counties and for the Nation.

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EMSC
MCJ-164002
10/01/91-09/30/94
Project Director(s):
Paul B. Anderson

PROBLEM: After completing formal emergency medical technician (EMT) training, emergency medical services (EMS) system personnel, especially those serving rural areas of the Nation, are still "unseasoned" for a considerable time until they obtain the necessary field experience. The period of time needed for EMTs to learn to make consistently good and fast judgment decisions in critical, life-threatening situations varies considerably, but usually takes months (sometimes several years), depending on their work volume. Pediatric cases are only a portion of the overall call volume, so EMTs need even more time to become competent and proficient in caring for children experiencing serious illness or injury. However, even after EMTs in rural areas acquire seasoned skills, their relative lack of exposure to critical patient situations can lead to deterioration of knowledge and skills over time. This problem also varies considerably among EMT personnel, due to differences in exposure to actual patient situations and in continuing education (didactic practical, and clinical).

GOALS AND OBJECTIVES: The following goals and objectives were developed in relation to specific project activities. The overall goal is to reduce the mortality and morbidity experienced by children in life-threatening medical emergency situations by improving the training of the Nation's EMS personnel, with particular emphasis on those serving rural areas.

The project has identified the following objectives:

1. Design and produce an interactive multimedia courseware program on Pediatric Medical Emergencies for prehospital EMS personnel;
2. Make this program available for use in EMS units throughout the State of Idaho, using the mobile interactive training unit approach; and
3. Make this program available for use by other EMS programs in the country to educate prehospital EMS personnel.

METHODOLOGY: The Pediatric Medical Emergencies program will be developed using the following methodology:

1. Develop a request for proposals (RFP) package by the oversight management team of the Idaho Emergency Medical Services for Children (EMSC) project, containing specifications for the design and production of the program;
2. Distribute the RFP package to interactive multimedia design and production contractors around the country;
3. Award a contract to design and produce the Pediatric Medical Emergencies interactive multimedia courseware program;
4. Develop a team consisting of Idaho EMSC project staff, Idaho EMSC physician consultants, and other content experts to work with the contractor to design and develop the training program;
5. Develop a conceptual plan for the program, using the combined efforts of the staff, consultants, and the contractor;

6. Develop detailed scripts and storyboards for this program;
7. Conduct preproduction, production, and postproduction phases of the videodisc project;
8. Conduct the programming and related development work needed to complete the program; and
9. Conduct alpha and beta testing of the completed program and make any necessary revisions before distribution.

EVALUATION: The project will be evaluated as the design and development work proceeds. At every key phase, the Idaho EMSC team will review progress and problems and decide whether revisions in project plans are needed. The program will be evaluated thoroughly during the alpha and beta testing process. This will include testing evaluation by content experts (alpha testing) and then by prehospital EMS personnel (beta testing). Finally, the program will be evaluated by all the EMS entities that use it to train their prehospital response personnel. Program revisions and updates will occur based on this continuous evaluation process.

EXPERIENCE TO DATE: The project has been delayed while Federal audiovisual approval was obtained. However, many lessons learned in developing other interactive multimedia programs (the Respiratory Emergencies in Children interactive videodisc and the work in progress on Pediatric Trauma) are being used to expedite design and production of this program now that audiovisual approval has been obtained. Lessons learned include considerable experience in delivering the Respiratory Emergencies in Children program to prehospital EMS personnel throughout Idaho, using the mobile interactive training unit approach.

Maine Pediatric Quality Assurance Project
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EMSC
MCJ-234002
10/01/91–12/31/93
Project Director(s):
Patrick Cote

PROBLEM: This project addresses three issues affecting emergency medical services for children (EMSC) in Maine: The inability to monitor quality of care for pediatric emergencies, to determine appropriate modifications, and to provide interventions that improve patient outcome.

GOALS AND OBJECTIVES: The goal of this project is to develop an ongoing pediatric quality assurance system to assess clinical needs and to implement appropriate interventions in the process of care to improve patient outcome.

The project has three outcome objectives:

1. Integrate pediatric quality assurance activities into the State's existing emergency medical services (EMS) Quality Assurance Program;
2. Integrate the Pediatric Outreach Program into the Division of Maternal and Child Health programs, analyze clinical and outcome data, and provide continuing education to hospitals covering 80 percent of the pediatric admissions in Maine (outside of the Maine Medical Center); and
3. Improve the State's capability for an integrated analysis of pediatric care, from prevention through rehabilitation.

METHODOLOGY: The project builds upon the existing structure of Maine EMS and develops a strong linkage with the Maine Division of Maternal and Child Health. Maine EMS has a strong leadership role in prehospital services. Maine's Title V agency has extensive experience with hospitals and prevention programs. A child passenger safety educator, funded by the traffic safety agency, will join the project to provide education in areas with crash injuries and low seatbelt compliance. This project has two interrelated and complementary components: Maine EMS, which provides direct input about quality assurance studies to prehospital policymakers through its statewide quality assurance committee and regional quality assurance coordinators; and the Division of Maternal and Child Health component, which provides pediatric outreach from Maine's only tertiary pediatric center. The Pediatric Outreach Program models a successful perinatal outreach program consisting of site visits, continuing education, case reviews, local option activities, and followup 3–6 months after the visit. Maine EMS has a quality assurance program that includes quality assurance coordinators in each of six regions, and a committee with statewide representation. The capacity to carry out pediatric quality assurance is increased with financial resources and support. The Maine EMS Data Research Unit provides information such as linked crash, EMS run report, hospital discharge, vital statistics, and census data to the EMS regions and the Pediatric Outreach Program. This leads to more comprehensive casefinding and also enables integrated quality assurance studies to extend from crash site through hospital outcome. Strong linkage between these two components of the project facilitate comprehensive integrated prehospital-hospital studies. Linkage has been established between the pediatric project director and Maine EMS and its statewide quality assurance committee, between the Maine EMS Data Research Unit and both components, and between the Pediatric Outreach Project and the regional quality assurance activities. The quality assurance consultant interacts with both components at multiple levels.

EVALUATION: The evaluation component will address three issues:

First, has pediatric quality assurance been integrated into the Maine EMS Quality Assurance Program? The project objectives are a direct measure. The success, procedures, and linkages are important foundations for continuation of pediatric quality assurance. The minutes and reports from the regions document the activities, and the followup reports estimate the impact of pediatric quality assurance on pediatric services.

Second, has the Pediatric Outreach Program been integrated into the Division of Maternal and Child Health programs, and has the program responded to clinical and outcome data? If the program reaches 80 percent coverage, a broad constituency will have been served with the potential for ongoing support. The Pediatric Outreach Program report will document the impact, strengths, and weaknesses of the program. The ability of the program to analyze clinical and outcome data will be demonstrated by the interhospital transfer report.

And, third, does the system have the capacity for integrated analysis of prehospital and hospital data? The impact of the integrated studies is an important measure of this capacity.

Methodology for Evaluation and Reduction of Pain and Distress in Pediatric Emergencies

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EMSC
MCH-294002
10/01/93–09/30/95
Project Director(s):
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PROBLEM: Medical emergencies in children are among the most distressing events in the lives of children and their families. Frightening and painful diagnostic and therapeutic procedures often occur; yet the pain, fear, and anxiety confronting the child and parents are frequently unrecognized and poorly controlled in the emergency medical services (EMS) setting. Providers of emergency medical services must begin to employ techniques to minimize pain and reduce the emotional toll of the emergency on the child and family. A standardized, rigorous, and reliable technique is needed to evaluate the pain and anxiety experienced by those involved in pediatric emergencies. A strategy for evaluating and reducing pain and distress in children and their parents during childhood emergencies is an important step toward improving the emotional and physical outcome of sick and injured children and their families.

GOALS AND OBJECTIVES: The goal of this project is to reduce the physical and emotional impact of emergencies on the child, the family, and the health environment. We will develop a methodology to assess interventions designed to improve outcome. We will then test the assessment tool in a prospective trial so as to validate the methodology. This methodology will provide the tools that can be used to assess additional interventions and train other providers in recognizing pediatric distress, and will reduce the emotional toll of injury and illness in settings that offer emergency medical services for children (EMSC).

METHODOLOGY: We propose a randomized, clinical trial comparing two regimens, ketamine/midazolam and fentanyl/midazolam, to minimize pain and distress in a sample of children 5–15 years of age who have orthopedic injuries requiring emergent procedures. The pain experience will be assessed using the Observation Scale of Behavioral Distress to score videotaped records of procedures. The Faces scale, a visual analogue pain scale, will also be used. Linear analogue scales and the State-Trait Anxiety Inventory will be used to evaluate anxiety in parents. To evaluate problems associated with our interventions, we will also document the physiologic complications and the adverse effects of the therapies employed. Physician satisfaction will be assessed, as will long-term outcomes for the children and parents.

The Missouri Department of Health and the other pediatric centers in Missouri support this project. These centers anticipate using this methodology to evaluate and reduce stress in pediatric emergencies.

EVALUATION: We plan to evaluate our progress in the context of the following timeline. In the initial 3 months of this project, we will set up the equipment, train staff in the protocol, and pilot the test instruments to establish reliability. The following 18 months will be devoted to data collection, including enrollment, randomization, administration of the pain and anxiety tests, and documentation of physiologic data and complications of therapy. Videotapes will also be reviewed for behavioral data coding. Collected data will be managed with a computer-generated data base.

The final 3 months will be devoted to data analysis and outcome reporting. Tracking of project activities will be achieved through investigator conferences. Monthly reviews of charts and videotape coding will be used to track patient enrollment and ensure accurate data collection.

This project will provide direct benefit to the population under study and to children undergoing similar procedures by providing a technique for effective reduction of pain and distress. In the future, this methodology will be adapted to other clinical problems in EMSC in order to reduce the pain and anxiety associated with pediatric emergencies.

Development of a Regional Pediatric Data Surveillance System

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EMSC
MCJ-364002
10/01/91–03/31/94
Project Director(s):
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PROBLEM: This demonstration project targets the improvement and expansion of a data surveillance system (Pediatric Emergency Registry) which was begun in upstate New York with assistance from an initial Emergency Medical Services for Children (EMSC) grant awarded to New York State in 1986. Data on all seriously ill and injured children who enter emergency rooms in this combined urban/rural area of 1.2 million people are entered into the data base with the collaboration of all 21 acute care hospitals. For the most part, data are collected manually by local hospital staff; registry staff members obtain the data at the larger medical centers. The system is unique in that all hospitals in the region have been collaborating in this effort for the past 5 years.

Problems with the current data surveillance systems include the following:

1. Data collection is manual and inefficient—computer technology would improve accuracy and decrease the labor intensity of data collection;
2. Efficient and precise linkage between emergency room data and hospital discharge data is lacking, preventing tracking of patients;
3. Data that would enable identification of minority patients and their use of the emergency medical services (EMS) system are not being collected; and
4. Lack of both data linkage and data relating to minority groups has diminished the system's usefulness as an epidemiologic tool and as a means of assessing the quality of care provided by the EMS system.

GOALS AND OBJECTIVES: The project has established the following goals and objectives:

1. Improve the completeness, quality, efficiency, and usefulness of the data surveillance.

   Objectives:

   a. Assist hospitals in developing an easier and more efficient method of collecting and sending data to the registry;

   b. Develop a computerized linkage with hospital discharge data so that principal discharge diagnoses, length of stay, disposition, complications, and major procedures can be included in each hospital's data set; and

   c. Establish linkage with data sets of other States and the National EMSC Research Database currently under development.

2. Demonstrate the usefulness of a pediatric emergency data surveillance system by analyzing four sets of data.

   Objectives:

   a. Determine the use of the pediatric EMS system in rural and urban areas by children with severe illness or injury;

   b. Assess the current practice of interhospital transfer and the need for a formal pediatric transport system;

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c. Establish the epidemiology of serious illness or injury among minority groups (black, Hispanic) and low-income populations, with specific attention to variation in rural/urban areas; and

d. Establish the relationship between emergency room diagnoses and final hospital discharge diagnoses as a measure of the accuracy of emergency room assessment.

METHODOLOGY: The project is carrying out the following activities:

Improving data surveillance: Project staff will provide assistance to all hospitals in developing mechanisms for relating existing computerized data bases (hospital discharge data, emergency department registration data, billing data) so that a minimal data set for pediatric patients with serious illness or injury can be extracted and placed in files compatible with dBase IV. We will supply all hospitals with dBase-compatible software for use with the files so that any data in logbooks but not in the data bases may be added. The hospitals will receive continued support for the efficient and timely transfer of data (by floppy disk or modem) to the main registry data base. Data linkages will be established with similar data bases in other States using the minimal data set/methodology currently under development by the EMSC Data Collection Task Force.

Demonstrating the data surveillance system: Data analysis for the four studies outlined above will be performed by the principal investigator and coinvestigators. The results of the studies will be made known to individual hospitals as appropriate for their internal quality assurance/improvement activities. In cases where problems are noted in the system of care, particularly with respect to minority groups, information will be shared with the appropriate health care system/EMS agencies and physician groups so that plans of action can be formulated.

EVALUATION: To ensure that the first project goal and objectives are met in a timely manner, the principal investigator, coinvestigator, or data clerk/analyst will make quarterly site visits to each hospital. Monthly telephone contacts with each hospital will be maintained to ensure continued data flow independent of the computer capabilities of the hospital.

The second project goal and objectives will be measured by issuing regular reports to individual hospitals, publishing articles in peer-reviewed journals, and developing formal communications with health system/EMS agencies at both local and State levels.

EXPERIENCE TO DATE: The major project activity has involved refining and expanding the Pediatric Emergency Registry data base, performing site visits to all hospitals in the region, generating individual hospital and regional data analysis reports, and developing the programming techniques necessary to accomplish the objectives of the first project.

1. Data base refinement and expansion: When the project started, emergency room data from 20 hospitals had not been entered since the end of 1989. During the first 3 months of the project, all 1990 data (representing approximately 4,000 patients) were entered; any missing data were retrieved by the information analyst via telephone or hospital site visits. Ongoing manual data collection efforts have continued while the programming techniques are being developed in collaboration with the hospitals. At this time, almost all 1991 data and several months of 1992 data have been received (requiring monthly or bimonthly contacts with the hospitals) and continue to be coded, edited, and entered. In addition, coding errors have been rectified and a code book has been initiated for more consistent coding.
2. Hospital site visits: After we sent an introductory letter to the chief executive officer of each hospital, we conducted a formal site visit at 19 of the 20 hospitals to review the purpose of this targeted project and to seek collaboration. The hospitals enthusiastically and universally endorsed the concept. During these visits, we were able to make assessments regarding the precise programming techniques and type of information that might be useful in each hospital.
3. Data reports: Individual hospital and regional reports of data collected during 1987–90 were generated and presented at the site visits. Trends were identified and reported, and the data have been used

internally for quality assurance and improvement activities at several hospitals. Currently, a report is being generated on all interhospital transports in the region over the past 4 years to demonstrate to the regional medical center the need for a formal pediatric transport system.

4. Computerization/programming methods: A 486 Gateway 2000 computer was purchased and the registry data base (information on 19,000 patients) was transferred. Programs were written to generate the data reports. During the past 2 months, our analyst programmer has developed a plan to use the SPARCS hospital discharge data base, the Uniform Billing Database, and emergency department data bases to streamline data collection. (Our programmer is developing an application program for use in each emergency room as a computerized log with additional fields to be used by each as desired.) Common data elements have been identified and site visits are now being made to implement merging of elements of these data sets via internal transfers of data. We are also contacting the New York State Department of Health to incorporate data from prehospital care records in the data base. Finally, we are collaborating actively with the Department of Surgery to establish a State-mandated Trauma Registry in the region: Common data elements have been identified, and steps have been taken to link the two projects together for better efficiency.

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EMSC
MCJ-364003
10/01/91–12/31/93
Project Director(s):
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PROBLEM: In New York City prior to 1986, there were no protocols in place for pediatric prehospital care, no pediatric standards for hospital emergency departments, and no endotracheal intubations performed on children. During our previous emergency medical services for children (EMSC) project, we were able to rectify these deficiencies. However, an evaluation of the advanced life support care delivered to children by the New York City emergency medical services (EMS) system is still lacking. Training of paramedics to intubate infants in the prehospital setting is still incomplete due to the loss of the animal operating room program of the American Society for the Prevention of Cruelty to Animals. A functional quality assurance model for emergency medical services for children does not yet exist. This project aims to address these deficiencies.

GOALS AND OBJECTIVES: The following goals and objectives relate to the three specific project activities.

Goal 1: Evaluation of the pediatric advanced life support component of New York City's EMS system.

Objectives:

1. Demonstrate the applicability of the Pediatric Ambulance Need Evaluation method as an objective measure of the use of ambulance resources; and
2. Determine whether advanced life support and basic life support ambulances are being used appropriately for the care of ill and injured children.

Goal 2: Develop a model quality improvement mechanism for pediatric advanced life support.

Objectives:

1. Evaluate the advanced life support care being delivered to children in New York City; and
2. Develop a quality improvement mechanism that will continue after the grant period ends and will serve as a model for other EMS systems.

Goal 3: Train New York City paramedics to intubate pediatric patients regardless of age.

Objectives:

1. Complete the training of New York City paramedics in infant intubation; and
2. Evaluate the paramedics' training in pediatric intubation and their subsequent field performance.

METHODOLOGY: The project will carry out the following activities:

1. Evaluating the pediatric advanced life support component: The Pediatric Ambulance Need Evaluation (PANE) score was developed to determine retrospectively whether a child required an advanced life support or basic life support ambulance or less acute mode of transportation. This score is objectively based on the child's emergency department diagnosis. PANE categories, developed by an expert panel reviewing emergency department diagnoses of children arriving by ambulance, categorized the level of

prehospital intervention required. The applicability of this scoring system will be demonstrated by applying the score to data collected at another hospital.

Ambulance call reports for all children who were likely to require advanced life support care (according to the assigned call type) will be reviewed to determine advanced life support interventions performed and to identify the receiving hospital. Emergency department diagnoses and outcomes will be obtained from receiving hospitals and used for a systemwide evaluation of PANE. This will be compared to the type of ambulance dispatched, to determine the ability of the EMS telephone triage system to assign the appropriate ambulance to pediatric calls.

2. Developing a model quality improvement mechanism: An expert panel will review the ambulance call reports for children transported by advanced life support ambulance, to assess the frequency, type, and appropriateness of advanced life support interventions. Interjudge and intrajudge reliability will be evaluated.

3. Training New York City paramedics to intubate pediatric patients: With the New York City EMS system, we will train paramedic instructors to teach this module. These instructors will train the (previously untrained) paramedics in using this module. We will (1) assess psychomotor, cognitive, and attitudinal changes associated with the training; and (2) identify factors associated with successful intubation, and the willingness to attempt intubation in children.

The project will collect information on all pediatric intubations performed in the New York City EMS system over an 18-month period. Intubations will be identified through a call-in system. Intubation data will be obtained through ambulance call review, receiving hospitals, and discussion with the paramedics involved. Data collected will include (1) child's age, diagnosis, and clinical status; (2) paramedics' method of intubation training, number of prior intubations performed (pediatric and adult), and length of experience as a paramedic; and (3) intubation procedure, including equipment used, number of attempts, complications, and outcome.

EVALUATION: Project activities will be tracked through regular meetings of project personnel to review the status of the objectives and to scrutinize the progress of related activities (training and data collection, entry, and analysis) with respect to the targeted completion dates.

Project achievements will be measured by obtaining the following endpoints:

1. Demonstrate the applicability of the PANE evaluation in emergency medical services for children;
2. Assess the ability of the EMS telephone triage system to assign appropriate ambulances to children;
3. Define the current level of New York City's pediatric advanced life support procedure (frequency, type, and appropriateness);
4. Assess efficacy of intubation training for paramedics;
5. Define current frequency, success, complications, and associated factors for pediatric intubations by New York City paramedics;
6. Develop a new module for paramedic intubation training for children; and
7. Develop a model for quality review that can be adopted by other EMS systems.

EXPERIENCE TO DATE: Progress has been made in each of the project objectives, and the following activities have been accomplished to date:

1. Evaluating the pediatric advanced life support component: An expert panel has been assembled, comprising six physicians who represent the spectrum of pediatric emergency medicine, including pediatric critical care, pediatric surgery, and general academic pediatrics. Applicability of the PANE scoring system was demonstrated by applying the score to data collected at another hospital. Data were collected from Harlem Hospital Center, another city hospital in the borough of Manhattan, over a period of 1 year. Data from ambulance call reports and emergency department records were entered into our

computer data base and combined with data already entered from Bellevue Hospital Center. To refine the PANE, the expert panel reviewed 222 diagnoses and came to a consensus on all but 13. Work continues, and we expect that a final PANE tool will be used systemwide in the second year of the grant.

All pediatric call types associated with the PANE advanced life support categorization from the Harlem and Bellevue Hospital data sets have been identified. A preliminary data review is being performed on hard copy of computer-assisted dispatch data. This is a critical component in the strategic planning phase for a systemwide analysis of pediatric calls.

2. Developing a model quality improvement mechanism for pediatric advanced life support: An expert review panel has been established, including the two principal investigators of this grant, the project administrator, the new five-member New York City Quality Assurance team and their supervisor, and two physicians from Harlem Hospital. To assess interventions, the panel has developed quality improvement indicators based on current protocols. A system of collecting ambulance call reports has been devised for retrospective review so that the panel can develop criteria for quality prehospital care for children.

3. Training New York City paramedics to intubate pediatric patients: The project has developed a teaching package to train all New York City paramedics in pediatric endotracheal intubation. The package consists of a didactic presentation, skill sheets, a skill station, scenarios, and a videotape (modified from other EMSC grant products). These have been developed with assistance from a professional educator. To date, 40 paramedic instructors have been trained in the use of these teaching materials. Another training session is scheduled to update 20 additional instructors. These paramedic instructors will, in turn, train the rest of New York City's paramedics in pediatric prehospital endotracheal intubation.

   Educational assessment tools have been developed with the help of a professional educator, and have been tested during the training program for instructors. These pretraining and posttraining tools include attitudinal questionnaires, cognitive examinations, and psychomotor skill testing. They are to be returned to the professional educator for validation. Once refinements have been made, they will be ready for use in year 2 of the grant.

RESOURCE CENTERS

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EMSC
MCJ-064003
10/01/91-09/30/94
Project Director(s):
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PROBLEM: There is a continuing need for information about programs and products designed to improve the care of critically ill and injured pediatric patients. This need is best met by a national coordinating center capable of providing information and resources on emergency medical services for children (EMSC). As a national center, the National EMSC Resource Alliance (NERA) can make materials developed by EMSC grants and consulting services readily accessible to all. The target audience for the National EMSC Resource Alliance includes professionals, agencies, organizations, and individuals interested in improving pediatric emergency care and integrating EMSC into emergency medical services (EMS) systems.

GOALS AND OBJECTIVES: The National EMSC Resource Alliance is a collaborative effort of organizations, institutions, and individuals dedicated to improving the health care of infants, children, and young adults. The overall goal is to serve as a resource for States and localities wanting to improve EMSC capacity within EMS systems.

This goal will be achieved through the following 14 specific objectives:

1. Identify NERA at Harbor-UCLA Medical Center as a center that provides information on development and implementation of EMSC activities within EMS systems;
2. Provide EMSC information and technical assistance to health professionals nationally;
3. Monitor and update the existing resource library of EMSC materials;
4. Pilot a distribution plan for EMSC grant products;
5. Organize a reference collection of EMSC-related commercial product catalogues and other resource materials;
6. Update, maintain, and exhibit the four EMSC displays at national, State, and local conferences related to EMSC;
7. Administer and promote access to the EMSC Bulletin Board on MCH-Net;
8. Publish four issues of *EMSC News* each year;
9. Develop and disseminate informational materials about copyright issues;
10. Work with the National Center for Education in Maternal and Child Health and the National Maternal and Child Health Clearinghouse to disseminate EMSC information;
11. Provide a summary and recommendations for an EMSC fellowship or midcareer education program;
12. Organize and promote regional conferences to integrate primary care pediatricians, family physicians, and other health professionals into EMSC;
13. Plan and coordinate the EMSC national conference; and
14. Plan and coordinate a Maternal and Child Health Bureau/American Academy of Pediatrics national conference.

METHODOLOGY: NERA achieves these objectives by working with key individuals from EMSC grants and representatives from many organizations. Five subcontractors will work with NERA to provide these

services: The American Academy of Pediatrics, which assists with the Technical Advisory Board and with coordination of regional conferences for primary care providers; the Los Angeles Pediatric Society, which provides logistical support for the primary care conferences; the National Center for Education in Maternal and Child Health, which develops and publishes abstracts of EMSC projects; the National Maternal and Child Health Clearinghouse (administered through The Circle), which distributes the abstracts; and Symposia Medicus, which will coordinate two conferences—the EMSC national conference in February 1994 and the Maternal and Child Health Bureau-American Academy of Pediatrics national conference.

NERA activities are coordinated with other State and local agencies. Project staff are in frequent contact with the California EMS Authority; consultant Marianne Gausche, M.D., serves as liaison to the Los Angeles County Department of Health Services, EMS Division. To keep others abreast of NERA activities, *EMSC News* and other outreach products are sent to State maternal and child health and EMS authorities.

EVALUATION: NERA actively evaluates all grant activities on an ongoing basis. Descriptive data are collected on the time spent on activities, on requests, and on resources provided. This information is used to assure effective networking and outreach to all areas. EMSC grant products are evaluated and described in the catalogue data base. Regional conferences and the EMSC national conference are evaluated by attendees via surveys and questionnaires. All evaluative information is used to continually improve services.

EXPERIENCE TO DATE: Demand for EMSC products and services has grown over the last 2 years. There have been few requests for consultation, so this service will be scaled back in the coming year. The major grant product this year has been the *EMSC Resource Catalogue,* currently in press. NERA has become an important resource for EMSC materials and information, and continues to work toward improving delivery of these services.

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EMSC
MCJ-114002
10/01/91-09/30/94
Project Director(s):
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PROBLEM: Since 1985, 31 States have received State and/or targeted issues grants for emergency medical services for children (EMSC). These grants address specific needs and deficiencies in the areas of injury prevention, data collection and research, public and professional education, development of pediatric care standards, and designation of pediatric referral centers.

Unfortunately, most EMSC grants have not achieved success in sustaining a coordinated program effort after Federal funding has ended. Planning for long-term survival of these programs within States is essential to maintain the advances in pediatric emergency care systems. New EMSC grants need technical assistance in coalition building and public policy in order to mobilize community and financial support for long-term survival of the EMSC program.

Most individuals and organizations at local, State, and national levels are not aware of the deficiencies and needs in pediatric emergency care. Developing public awareness and concern about EMSC issues must be essential activities within EMSC projects if these projects are to obtain community support and cooperation.

GOALS AND OBJECTIVES: The goal of the EMSC National Resource Center is to provide technical assistance to EMSC projects to promote their organization and initiation of activities, and to assist them in long-term planning for continuation after Federal funding ends.

The project objectives are to:

1. Assist each EMSC project to develop and sustain at least one local or State coalition of health professionals, civic leaders, and private citizens by providing education and technical assistance;
2. Provide technical assistance in project startup to EMSC implementation and targeted issues grants in their first project year;
3. Increase awareness and foster involvement of EMSC projects in public policy activities at the State and Federal levels; and
4. Assist EMSC State and targeted issues projects to develop plans for continued activities after Federal funding ends.

METHODOLOGY: Project activities include the following:

1. Provide technical assistance on the benefits and process of building and maintaining a coalition;
2. Provide guidance to EMSC project advisory boards on their role and function, tools for building consensus and identifying priority issues, volunteer recruitment, and governance;
3. Develop relationships with national organizations and distribute information and local contacts to EMSC projects;
4. Host a preconference orientation session at the EMSC annual meeting for all first-year grantees;
5. Present relevant legislative and policy information to EMSC projects through newsletters and consultations; and
6. Research and provide information on funding opportunities to EMSC projects.

The EMSC National Resource Center will facilitate coordination between emergency medical services, maternal and child health, and other appropriate agencies at the Federal, State, and local levels. In addition, the center will foster coordination with members of voluntary and professional organizations. At the national level, the center will strive to improve public awareness of EMSC and to increase the visibility of EMSC within national organizations and agencies.

EVALUATION: Evaluation will reflect the number of consultations provided in the areas of coalition building, project startup, public policy, and funding. Process evaluation will also reflect the developmental stages of EMSC State and/or local coalitions and the number of national organizations that become involved with EMSC.

EXPERIENCE TO DATE: For 2 years, the EMSC National Resource Center has provided technical assistance to EMSC projects in their first and second years in the areas of coalition building, project startup, public policy, and funding. Staff at the National Resource Center have conducted workshops at State, regional, and national meetings on these topics. Relationships are now established with approximately 43 national organizations and Federal agencies. Through this project, "EMSC—Rx for a Community Approach" was developed and disseminated to all EMSC projects. The EMSC National Resource Center has also disseminated a public policy newsletter, grants alert, and information on organizations interested in EMSC and related issues.

PROJECTS COFUNDED WITH THE NATIONAL INSTITUTE OF MENTAL HEALTH

Evaluation of Interventions in Childhood Brain Injuries

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EMSC
R18-MH47958
9/1/90–8/31/94
Project Director(s):
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Robin Morris, Ph.D.

PROBLEM: Traumatic brain injury (TBI) is often accompanied by psychiatric sequelae such as chronic emotional and behavioral problems.

GOALS AND OBJECTIVES: The goal of this project is to develop, implement, and evaluate a child- and family-focused psychological intervention to prevent the occurrence of psychological problems in children with TBI.

METHODOLOGY: The goal of this project is to determine what combination of child- or family-focused treatment is effective in promoting positive outcomes in children ages 6–15 years who have recently sustained a moderate-to-severe traumatic brain injury (TBI) and who are at significant risk of developing chronic emotional and behavioral problems. The study involves a control group (no treatment) and an experimental group that receives child-focused classroom treatment and family-focused intervention as determined by family need. Children in the experimental group complete at least 16 weeks in the Transitional Classroom Program at Georgia State University and their families receive a range of family treatment, including family therapy and other family-focused services as needed. Children are tracked for up to 2 years postinjury and their families receive assistance with finding the most appropriate school placement.

EVALUATION: The primary outcome measure is the psychological functioning of the children. Additional measures include family functioning and the neuropsychological functioning of the children.

EXPERIENCE TO DATE: Project accomplishments include the following:

1. A program for inclassroom group therapy, entitled the Rainbow Circle Program, has been developed and a procedural manual is being produced.
2. Training workshops have been conducted for educators and mental health professionals on intervention for children with TBI.
3. A referral and service system has been developed to fill the gap between acute care in the hospital and the return to community schooling. This system provides the interface between the medical and educational systems.

Specialized Family Emergency Room Program with Suicide Attempters

Research Foundation for Mental Hygiene
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EMSC
R18-MH48059
9/1/90–8/31/95
Project Director(s):
Mary Jane Rotheram-Borus, Ph.D.
Contact Person:
John Piacentini, Ph.D.

PROBLEM: Studies indicate that fewer than 25 percent of adolescents who have attempted suicide attended five or more sessions of outpatient treatment in the year following the attempt. Estimates of the number of adolescents failing to attend or complete even brief courses of outpatient treatment after a suicide attempt range as high as 90 percent. The researchers believe that significantly more adolescents and their families will accept the treatment offered after they have experienced the specialized intervention in the emergency room.

GOALS AND OBJECTIVES: The primary goal of the program is to increase the followup mental health treatment adherence by suicidal adolescents and their families by (1) improving staff attitudes toward families, and (2) educating families within the emergency room setting about the importance of followup mental health treatment. Secondary goals are to (1) increase rapport between emergency room staff and families, (2) change families' expectations of therapy, and (3) make adherence to followup mental health treatment an explicit objective of all staff interactions with the adolescents and their families.

METHODOLOGY: This project evaluates the effectiveness of a specialized emergency room family intervention for a consecutive series of 200 (predominantly black and Hispanic) female suicide attempters ages 12–18 years. Female suicide attempters will receive either standard emergency room care plus brief family therapy (control group) or a specialized emergency room program and brief family therapy (intervention group). The specialized program will include: 90-minute crisis intervention with the family; a brief videotape about what families can expect in therapy; and training for emergency room, child psychiatry, and adult psychiatry staff in issues concerning adolescent suicide.

The program has three primary components, developed through focus groups with adolescents, their families, and providers from each discipline (pediatric psychiatry fellows, pediatric residents, emergency room nurses, emergency room patient representatives, and security officers).

1. Emergency room staff received training using the manual developed by the project directors. Individual workshops targeted each discipline involved in interactions with adolescents and their families in the emergency room. Workshops were designed to provide a general overview of the course of treatment of suicidal adolescents from point of entry to the emergency room. In addition, the concerns and interests of each discipline were specifically addressed in preworkshop focus groups, and each discipline received a specialized training module. The goals of these workshops were to provide a general overview of the treatment of a suicidal adolescent, as well as to improve the attitudes of emergency room staff toward the adolescents and their families and toward immediate treatment. Approximately 55 Columbia Presbyterian Medical Center staff have received the training.
2. A 20-minute videotape was developed to encourage both adolescents and their parents to participate in the specialized outpatient treatment. The videotape follows two adolescents through the emergency room and provides information about what to expect and about the rationale for treatment. The videotape depicts the initial emergency room-based treatment session and explains that a brief course of treatment will follow the emergency room visit. This point is reinforced by the emergency room-based case manager during the initial session immediately following presentation of the videotape. Originally filmed in Spanish and then dubbed in English, the videotape follows the format of a Spanish soap opera.

3. A bilingual crisis social worker is on call 24 hours a day. As soon as an attempter comes into the emergency room, the social worker serves as a liaison with the family, provides emotional support, conducts an initial treatment session, and works to reduce anxiety. The social worker shows the videotape and discusses it with the attempter and family, and serves as a link between the emergency room and the followup treatment clinic.

EVALUATION: The number of suicide reattempts and suicide-related risk factors will be assessed at 3, 6, 12, and 18 months. Data analyses for the entire sample are currently underway. Preliminary analyses for the first 125 subjects, however, revealed that female attempters in the intervention group were more likely to return to the clinic for at least one session, attended more therapy sessions on average, and were less likely to have their cases closed for noncompliance than were attempters in the control group. On average, the intervention was associated with an increase of approximately 20 percent in the amount of treatment received and a decrease of 60 percent in the number of patients failing to return to the clinic for any treatment at all. This study demonstrates that an emergency room-based intervention can have a positive impact on the amount of followup treatment received by female adolescent suicide attempters and their families. The importance of family factors, as both precipitants of suicidal behavior in adolescents and determinants of treatment adherence and outcome, has been demonstrated in the literature. Including other family members—especially mothers—as primary targets of both the emergency room-based intervention and followup treatment may have played an important role in the success of the program.

EXPERIENCE TO DATE: Project accomplishments include the following:

1. The project has developed the following materials: The manual for staff training, the videotape entitled "A New Beginning," and *Successful Negotiations/Acting Positively*, a therapy manual focusing on cognitive and behavioral family therapy.
2. Manuals for emergency room staff treating suicidal adolescents and their families were distributed to training staff within the Columbia Presbyterian Medical Center. In addition, manuals were distributed at a number of presentations and workshops that outlined the intervention. To date, providers of Emergency Medical Services (EMS) and Emergency Medical Services for Children (EMSC) have not received training using the manuals; however, training workshops would present an ideal forum for training these providers. Approximately 350–400 manuals have been distributed to pediatric psychiatry fellows, pediatric residents, emergency room nurses, emergency room patient representatives, security officers, and others.
3. Preliminary analyses of the first 95 subjects in the control group have identified a number of baseline factors related to treatment adherence. Increased levels of adolescent ideation and adolescent and maternal depression and positive parental attitudes toward treatment all showed a significant positive relationship to the number of treatment sessions attended. Adolescent ratings of poor family adaptability were negatively related to the number of sessions attended. Maternal depression and single parent family status were positively related to completion of the six-session treatment protocol, while age was the only significant predictor of a return to the clinic for any treatment following the initial emergency room evaluation.

COMPLETED EMSC PROJECTS

Demonstration Projects for Pediatric EMS Systems Components

University of South Alabama
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EMSC
MCH-014001
02/01/86–01/31/89
Project Director(s):
Lynn Davidson, M.D.

PROBLEM: The main goal of the Alabama emergency medical services for children (EMSC) project has been to identify essential components necessary for the emergency care of the acutely ill or injured child. Seven subprojects evaluated key aspects of these necessary components and demonstrated a composite system for pediatric emergency care which is applicable to any area of the United States wishing to integrate an EMSC system into the current adult-oriented systems.

GOALS AND OBJECTIVES: The objectives of the Alabama project were designed to cover the full continuum of emergency medical services for the child, from prevention of injury to rehabilitation. If we are going to truly impact pediatric trauma mortality, we must involve ourselves in all phases of injury control. One of the objectives of this project was to decrease morbidity and mortality in children involved in motor vehicle collisions by promoting the use of appropriate child restraint methods, and to increase compliance with State laws regarding such restraints. A second preventive objective was concerned with recognizing the intentionally injured child and providing appropriate notification to child protective services.

Emergency transport of the critically ill child to a regional pediatric center is an integral function of an EMSC system. A major objective of the project was to define the characteristics and needs of the population served by transport, to elucidate the transport modalities that must be available in an EMSC system, and to verify system effectiveness by monitoring outcome variables for each child accessing the system. Educating the public, the prehospital care provider, and the rural physician about the assessment and management of pediatric emergencies are important components of an EMSC system, and educational models were developed by the Alabama project to address each of these populations. The positive impact of rehabilitative services on patient outcome has been well established and must be considered part of the trauma care continuum. The final goal of the Alabama project was to establish a matrix of currently available rehabilitative services for the injured child, based on the perception of those using them.

METHODOLOGY: The subproject demonstrating injury prevention objectives conducted an extensive public education campaign aimed at law enforcement officials, parents, and elementary school children, whereas the subproject evaluating the intentionally injured child surveyed emergency department records of children presenting with specific injury patterns and medical conditions. Evaluation of transport of the critically ill child utilized a comprehensive, regional data base reflecting multiple comparisons between air and ground transport modalities for children accessing the emergency medical services (EMS) system. The educational subprojects developed curriculums and teaching methods on assessment and management of pediatric emergencies appropriate for three different levels of providers—the parent, the prehospital professional, and the primary care physician and nursing staff. A matrix of available rehabilitative services was compiled through written questionnaires submitted to participants in the National Pediatric Trauma Registry.

EVALUATION: Each subproject used a unique evaluative method specific to the goals of the project. Educational programs used the increase in knowledge, measured by precourse and postcourse testing. Public education projects used social parameters assessing change in behavior. Data base projects used completeness and accuracy of data collected.

EXPERIENCE TO DATE: Project accomplishments include the following:

1. Results: The overall goal of the Alabama EMSC project was to demonstrate effective models for the necessary components of an EMSC system and the integration of those components into currently operating adult-oriented systems. It is now possible to outline the six major components of an EMSC system: (1) System description, (2) prevention, (3) education, (4) standards of care, (5) quality assurance, and (6) research and development. The subproject investigating transport modalities serves as a model for system design by designating the needs of a regional system and describing the factors that must be inherent in the system to meet those needs. An EMS system must provide the mechanism to prevent unintentional injury and death, and the subprojects on childhood restraints and intentional injury demonstrated viable models for incorporating prevention into the EMS system. Educating professionals and the public and establishing treatment protocols are key components in the success of an EMS system, and the Alabama project has demonstrated workable educational programs that can be readily incorporated into the adult-oriented EMS systems, thus promoting the knowledge and protocols necessary to assess and manage the critically ill child. Quality of the system is assured by a data base that analyzes outcome variables with a variety of prehospital interventions including field treatment and transport modalities, and subserves the research and development component by maintaining the system at an up-to-date level of performance.
2. Dissemination, utilization, and followup: The results of the transport subproject have provided the data necessary to quantify the needs of the region and the EMSC system necessary to meet those needs. The educational subprojects promoted the concept of specialized training in pediatric emergencies and have been integrated, with some modification, into the educational network of the State EMS system. The model developed for prevention of injury to children in motor vehicle collisions demonstrated the utility and effectiveness of an intensive public awareness campaign and will be duplicated for other prevention topics. Data collected for rehabilitative services have prompted the formation of a task force on the needs of the technologically dependent child, and data on intentionally injured children have influenced the initiation of a multidisciplinary child protection team in the community.
3. Replication: Easily adaptable to any rural/urban EMSC configuration, the project requires, at minimum, a core group composed of a medical director, paramedic, and clerical assistant. Depending on the resources of the region's EMS system, operating costs may easily be integrated into the annual budgets of the currently operating systems.

Alaska EMS for Children
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EMSC
MCH-024001
10/01/89–09/30/92
Project Director(s):
Mark S. Johnson, M.P.A.

PROBLEM: This project addresses the problems of pediatric emergencies in Alaska through interventions at various stages of disease and injury affecting children, and the system that is designed to combat these problems.

GOALS AND OBJECTIVES: The overall goal of this project is to improve the emergency medical care system in Alaska and its ability to treat and rehabilitate Alaska's acutely ill and injured children, as well as to prevent childhood injuries and deaths. The project addresses deficiencies in the emergency medical services (EMS) system at all levels—prehospital, hospital, and rehabilitative services.

METHODOLOGY: The project implemented the following activities:

1. Prehospital level: At the prehospital level, pediatric emergency care instruction has been emphasized. By the end of the second project year (September 30, 1991), a 2-day pediatric emergency care course and individual course modules were provided to more than 1,000 EMS and health care personnel in rural communities and cities through the State. Most of this training was provided by 74 instructors who completed a 3-day pediatric emergency care instructor course during the first year of the project. Many of these instructors live in rural communities and can provide less costly and more relevant instruction directly to their own areas than centralized instruction could provide.

   In addition, three preceptorship programs have been developed. The first program offered the opportunity for registered nurses, nurse practitioners, and physician's assistants to work in a large hospital for 5 days or more. The program enabled these practitioners, many of whom are from rural areas, to increase their experiences and skills in treating pediatric injuries and illnesses. The program included a number of self-study modules and evaluation components.

   A second preceptor program, designed specifically for physicians and registered nurses, offered out-of-State advanced training in pediatric emergency care. (Training in various areas of pediatric care is not available in Alaska.)

   The third preceptor program was designed for emergency medical technicians (EMTs) at all levels, as well as for paramedics. The program involved 20–24 hours of assessment and hands-on experience with care of pediatric patients in hospitals and clinics throughout the State. This program also included self-study modules and evaluation components.

   Another prehospital component of the program, developed during the second year of the project, involved injury prevention. Five injury prevention projects were funded, and two additional projects will be funded during the project's third year. Two projects targeted the Anchorage metropolitan area, which comprises approximately half of the State's population. One project targeted the North Slope Borough but included development of materials for statewide use. The remaining four projects were designed for statewide use. The projects address the following issues: Drowning; use of bicycle helmets, snowmobile helmets, and seat belts; installation of smoke alarms; firearm safety; accessing the emergency medical services system; injury prevention among foster families; and a variety of issues focusing on local needs (presented as part of a traveling robot ambulance program).

The Alaska State EMS Section also received an injury prevention/control grant from the Centers for Disease Control and Prevention (CDC). Staff from the EMSC project and the prevention/control grant worked closely together on childhood injury prevention efforts.

Because of the vastness of the State and its numerous isolated rural villages, many pediatric emergency patients spend considerable time in rural clinics waiting to be transported, usually by air, to higher level facilities and hospitals. To address these issues, the *Alaska State Medevac Manual: Guidelines for Medevac Escort* is being developed for distribution in early 1992 to all EMS air transport services in the State.

2. Hospital level: The project also included a survey of pediatric capabilities of ambulance and first responder services, rural community health aide clinics, and hospitals in the State. The survey of ambulance/first responder services and community health aide clinics focused primarily on the availability of pediatric emergency equipment. Based on this survey, the project purchased and distributed needed pediatric equipment valued at $40,000 to ambulance/first responder services and clinics throughout the State. The project will also purchase and distribute additional equipment valued at $20,000 during the final project year.

   The hospital survey not only assessed the availability of equipment and medicines, but also assessed staff training, staff capabilities, and policies and procedures. Survey results will be compiled, summarized, and distributed in an informational packet to State health care workers as a resource for referral.

   A trauma register has also been developed by this project. During the first 2 years of the project, the trauma register evolved from pilot phase to an injury surveillance system that includes collection of data at each of Alaska's 25 acute care hospitals. Analysis of trauma register data will have major policy implications for the emergency care provided to children in Alaska.

   The project also included the compilation of 1990 data on medical and trauma admissions of children to hospitals. This compilation involved 12 of the 15 hospitals in the State with computer capabilities. Analysis of data will provide a clearer picture of the types of injuries and illnesses affecting children in Alaska, as well as information on the sites where these injuries and illnesses occur. The results are expected to have policy implications for the emergency care and injury prevention programs provided to children in Alaska.

   Finally, at the hospital level, a hospital-oriented pediatric advanced life support (PALS) course entitled "Beyond PALS" is being developed. Materials from similar courses developed by Florida and Arkansas EMSC projects will be combined with other course materials to produce a curriculum and student manual focused primarily on needs of rural physicians and nurses. This course will be available to each of Alaska's hospitals free of charge for the first presentation and for a nominal fee thereafter.

3. Rehabilitative services level: Treatment of severely injured or ill children often does not end with discharge from the hospital. Home care and rehabilitative care is frequently necessary. To ensure adequate care, especially in rural areas of the State, the Alaska project included development and implementation of a discharge planning program. The program has developed the following: A tracking system to identify children at risk; a uniform discharge planning process for the five hospitals providing services to most of Alaska's pediatric patients; an educational presentation for health care workers on discharge planning; a Parent Resource Guide for parents of special needs children to assist them in locating, evaluating, and securing health care resources for their children; and a discharge planning manual.

   The EMSC project activities address a range of needs. This effort was made possible in two ways: First, health care personnel throughout the State volunteered many hours to assess pediatric needs and to direct various components of the project. They developed standards and guidelines; wrote, reviewed, and edited materials for newsletters, manuals, and instructional curriculums; and taught classes.

   Second, the combined efforts and funding of the EMSC project and the injury prevention/control grant allowed much to be achieved in the area of child injury prevention. Staff from the two projects coordinated efforts and combined funding to support overall State injury prevention planning as well as specific projects.

EVALUATION: Pretests, posttests, and student evaluations of courses and instructors are being used to evaluate the pediatric prehospital care course, two of the three preceptorship programs (excluding the advanced preceptorship program), six of the seven injury prevention projects, and the "Beyond PALS" course. The pediatric prehospital care course also included a 6-month posttest given to randomly selected students.

The medevac manual will be evaluated through its level of use. The evaluation of the trauma register is based on the number of reports provided to hospitals, the use of those reports for quality assurance purposes, and the number of requests for information and data for educational, research, and training purposes. The discharge planning component of the project included an initial survey on discharge planning given to all hospitals in the State. This survey will be given again at the end of the project to measure project effectiveness. Distribution and use of the discharge planning manual and the parents' resource manual will also serve to evaluate the success of the project. Finally, the discharge planning component includes quarterly evaluation contacts with participating hospitals.

EXPERIENCE TO DATE: Almost all goals established at the beginning of the project, or added in the second year grant application, have been or will be accomplished by the end of the third project year. Beyond addressing the remaining goals and objectives, the primary focus in the third year is to integrate components of the program into the State EMS system and to integrate the discharge planning component into the program of the Maternal, Child, and Family Health Section of the Division of Public Health.

The following measures will help to ensure program integration into the EMS system:

1. The pediatric emergency care course will continue beyond the end of the project (primarily because of the large number of instructors trained for the course) and will provide continuing education hours to help meet requirements for recertification;
2. The State EMS Training Committee, a subcommittee of the Governor's appointed Advisory Council on Emergency Medical Services, revised the skill sheets used in EMS training throughout the State by adding pediatric-specific skills, making them more appropriate for pediatric patient care, and adding a preface describing their use for pediatric patients;
3. The medevac manual will continue to be used, with periodic updates as needed;
4. The "Beyond PALS" hospital course will become self-supporting after the first presentation to each rural hospital;
5. Injury prevention will remain an integral part of statewide EMS efforts;
6. Efforts to maintain funding of the trauma register component will continue; and
7. Two of the three preceptorship programs will continue after the project has ended.

Finally, the Maternal, Child, and Family Health Section is committed to continuing discharge planning efforts as part of its activities supported by the State General Fund.

The following project materials have been or will be developed: *Pediatric Prehospital Care Instructor Manual, the Pediatric Midlevel Preceptorship Preceptee Notebook, the Prehospital Pediatric Preceptor Notebook, Alaska State Medevac Manual: Guidelines for Medevac Escort,* and the "Beyond PALS" course curriculum.

BEST COPY AVAILABLE

Demonstration Project: Emergency Medical Services for Children

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EMSC
MCH-054001
10/01/87–09/30/91
Project Director(s):
Debra H. Fiser, M.D.

PROBLEM: The Arkansas Demonstration Project: Emergency Medical Services for Children (EMSC) was funded through the U.S. Department of Health and Human Services, Maternal and Child Health Bureau, as a result of the 1984 Emergency Medical Services for Children initiative. The grant was awarded to the University of Arkansas for Medical Sciences' Department of Pediatrics, affiliated with Arkansas Children's Hospital. The purposes of the project were to evaluate and improve the outcome of pediatric emergencies in Arkansas and to disseminate knowledge and innovations gained from the project to other States.

GOALS AND OBJECTIVES: The project was designed with four primary goals: (1) Increase knowledge of the consequences of emergency illness and injury among Arkansas children; (2) improve the emergency medical services provided to children, particularly handicapped and minority children; (3) determine the effectiveness of the proposed methodologies in reducing the morbidity and mortality associated with pediatric emergencies; and (4) identify effective methods of imparting new EMSC knowledge and promoting adoption of effective programs developed by other States.

METHODOLOGY: The Arkansas EMSC system was operationally defined as a cyclic and comprehensive system including the home, emergency medical services (EMS) systems, local medical facilities and personnel, secondary interhospital transport systems, tertiary pediatric facilities, and rehabilitative services. Each component was systematically evaluated, and strategies were chosen to address major deficiencies. A broad-based, regionalized approach was chosen for implementation of subprojects. This approach involved interaction with many statewide agencies, including the various offices of the Arkansas Department of Health and the Area Health Education Centers of the University of Arkansas for Medical Sciences.

EXPERIENCE TO DATE: Specific accomplishments of the Arkansas EMSC Demonstration Project include the following activities, products, and results:

1. Pediatric morbidity/mortality data collection—system evaluation and monitoring. Initial Arkansas EMSC activities included developing a prospective data collection network with 10 representative Arkansas hospitals. This data base now includes information on more than 10,000 children who experienced an emergent illness or injury in 7 regions of the State. The data have been especially helpful in identifying the types of child emergencies with the highest morbidity and mortality in Arkansas.

   Subsequent data collection focused on more specific populations with increased risk of mortality or morbidity as a result of their pediatric emergencies. To date, studies have included evaluation of potential long-term morbidity in pediatric emergencies; assessment of the impact of a 911 telephone access system on child emergency outcomes; development of a pilot retrospective tracking system for pediatric intensive care unit patients via a portable computer, and definition of a pilot system for quality assurance for secondary critical care transports.

2. Improved professional education in pediatric emergency care. A second major focus of the Arkansas EMSC project was the development of educational courses in Pediatric Advanced Life Support (3 days) for physicians, nurses, and paramedics and pediatric Basic Life Support (2 days) for emergency medical technicians. These courses were taught in seven locations around the State during the spring of 1988 and have continued to be offered on a regular basis through Arkansas Children's Hospital. The courses have also been videotaped with copies distributed to over 50 regional Area Health Education Center libraries and strategic rural hospitals statewide. The project has also successfully introduced the use of intraosseous infusions by prehospital providers through the development of an instructor training course and intraosseous training materials for prehospital providers.

3. Pediatric emergency care protocols and facility standards. As an adjunct to its health care provider education, the project has developed three sets of algorithms for pediatric emergencies for use by hospital professionals, prehospital paramedics, and prehospital emergency medical technicians. The algorithms for hospital providers were distributed to all Arkansas hospitals in the form of "Child Emergency Packets" for placement with the "crash carts" in each emergency department.

   The prehospital algorithms have been distributed via the State Office of Emergency Medical Services to every licensed ambulance service in Arkansas and have also been shared with interested EMS providers in several other States. Project staff also coordinated development of standards for the use of the intraosseous infusion technique in the prehospital setting and implementation of the technique statewide by Arkansas EMS providers via the State Office of Emergency Medical Services.

   The Emergency Departments Approved for Pediatrics (EDAP) project was the approach used by the State to upgrade the capabilities of local emergency departments to manage child emergencies. Minimum guidelines for pediatric emergency equipment, supplies, and staffing were developed and mailed to every Arkansas hospital, with an invitation to participate voluntarily in the project. Any hospital desiring to participate received a consultative site visit from a pediatric emergency medicine physician. These site visits provided mechanisms for specific suggestions for improvements in local pediatric emergency care. Thirty-four hospitals statewide received EMSC visits. Training has also been completed for Arkansas Department of Health facility review teams on specific pediatric emergency requirements.

4. Improved public awareness of child emergencies. Another initial Arkansas EMSC objective was to increase the public's ability to manage pediatric emergencies. Project efforts included production of a 30-second public service announcement to increase public preparedness for child emergencies (the need for learning infant/child cardiopulmonary resuscitation and first aid, the circumstances under which an ambulance should be called, and the procedures to access the EMS system). This public service announcement has been copied, distributed, and aired by television stations in Arkansas as well as in Texas and Louisiana border communities to reach the maximum number of parents.

   Additional efforts in public education have involved development of a statewide Childhood Injury Prevention Program. Activities have included analysis of Arkansas EMSC child injury data, development of Arkansas SAFE KIDS chapters, community childhood injury prevention campaigns, presentations to State health care providers, media announcements on childhood injury prevention, and participation in the national Year of the Child in Emergency Medical Services campaign.

5. Dissemination and utilization of results. Arkansas EMSC Knowledge, Transfer, and Utilization (KTU) and national EMSC networking activities have included: (1) Providing education and training materials in pediatric emergency care to U.S. Air Force medical personnel from bases in Arkansas and surrounding States; (2) providing education and training materials and consultation to Acadian Ambulance Service, a large rural Louisiana EMS service, for improved training of their EMS personnel in pediatric emergency care; (3) networking with the regionalized health care system in northwest Mississippi to upgrade local emergency departments' capabilities to manage pediatric emergencies; (4) developing and disseminating process models on the various approaches used in Arkansas EMSC activities; (5) disseminating information via scientific meetings, abstracts, and publications; and (6) participating in national EMSC task force groups and the national EMSC conference.

6. Integration and followup: The various Arkansas EMSC activities were developed so that portions could be integrated into existing agencies' future responsibilities. An even greater measure of the project's success, however, is the increased statewide interest and enthusiasm for issues related to the emergency care of children. Several followup programs and proposals have already been generated, especially in

the areas of childhood injury prevention and health care provider education in pediatric emergency care. Integral to the success of EMSC efforts in Arkansas were the adequate human and financial resources to initiate, adapt, refine, and incorporate pediatric emergency standards, equipment, and training into existing health care systems at the local level.

Emergency Medical Services for Children in Rural and Urban Settings

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EMSC
MCH-064001
02/01/86–05/31/89
Project Director(s):
James S. Seidel, M.D., Ph.D.
Lynn Headley, M.D.

This project was designed to develop an Emergency Medical Services for Children (EMSC) program in California. All of the material and protocols developed have been implemented in California. Ongoing mechanisms have been developed. Material and newsletters have been shared at the national level.

The major goal of this project was the development of a project providing emergency medical services to children in participating counties in California.

The measurable objectives are included in the attachment labeled Final Report, October 27, 1989. This included the analysis and evaluation of data, continued systems development with participating counties, publication of a manual on *Developing EMS Systems for Children in Rural and Urban Areas,* collaboration with the District IX American Academy of Pediatrics Critical Care Committee, and work with other states in the development of EMSC systems.

The methodologies implemented to accomplish the goals and objectives include the collection and analysis of data, development and implementation of program criteria, development of guidelines, holding coordination meetings, preparation of articles regarding EMSC, planning and development of EMSC projects and many other activities which are included in the project final report dated October 27, 1989.

This project was evaluated on the basis of the completion of project goals and objectives which included development of EMSC in program sites, promotion of EMSC, and other stated activities.

The outcomes from EMSC as of the end of this project are addressed in the October 27, 1989 report. However, new EMSC sites were successfully established in California.

Several publications resulted from this EMSC project. They include: (1) *Prehospital Care of Pediatric Emergencies: Management Guidelines,* (2) manuals for the development of urban and rural EMSC, (3) a pediatric medical/trauma severity scoring system, (4) outline for an educational program, (5) guidelines for secondary transport of critically ill children, (6) a pediatric prehospital care equipment and supply list, and (7) preliminary data on outcomes of children and cost of prehospital care.

An ongoing newsletter was established sharing information on California EMSC projects. As of project completion, there were 3,500 names on a mailing list. Information has been shared with other states and is available to interested parties.

Legislation was enacted in California (Senate Bill 1170) which appropriated $135,000 for the State Department of Health Services to contract for a study to determine outcome measures to be used to evaluate the implementation of a critical care system for critically ill and injured children in California. The Maternal and Child Health Branch issued a request for proposals and selected and funded the Research and Education Institute, Inc., Harbor-UCLA Medical Center. A report is due to the California Legislature and the Governor no later than January 1, 1991.

The entire federal grant of $941,724 was expended on this Emergency Medical Services for Children in Rural and Urban Settings project. California does not currently have cost estimates for replication of these projects on a statewide basis. The study resulting from Senate Bill 1206 will hopefully be able to provide further information on overall costs of implementation.

Emergency Medical Services for Children:
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EMSC
MCH-114001
10/01/87–09/30/91
Project Director(s):
Jane Ball, Dr.P.H.

PROBLEM: The enhancement of emergency medical services for children (EMSC) is expected to reduce the morbidity and mortality for children with acute illnesses and injuries. An estimated 1 million children experience a closed head injury annually. Traumatic brain injury (TBI) has a high mortality rate, and an estimated 16 percent of TBI children require hospitalization. Significant morbidity, particularly in cognitive functioning and behavior, has been reported in the literature. This demonstration project addressed the consequences of traumatic brain injury in children and focused on the rehabilitation component of emergency medical services for children.

GOALS AND OBJECTIVES: The goal of this project was to explore the consequences of pediatric traumatic brain injury and the needed rehabilitation services for children and their families.

METHODOLOGY: This project conducted a retrospective descriptive study of children with traumatic brain injuries. The sample of 93 study children was drawn from 465 eligible children in the Children's National Medical Center Trauma Registry. Criteria for selection of study children were as follows: (1) Age between 6 and 14 years, (2) injury at least 12 months prior to data collection, and (3) injury severe enough to require hospital admission. Data were collected from numerous sources, including parent interview, teacher survey, medical records, and physical examination of the child. Children were administered numerous standardized tests in neuropsychology, speech and language, behavior, and motor domains in one hospital visit.

EXPERIENCE TO DATE: During data analysis, efforts were made to identify the actual residual effects of traumatic brain injury in children with mild, moderate, and severe injuries. Impairments were identified in study children in each domain with standardized tests; however, the type of impairment varied by child characteristics such as age at time of injury and injury severity. It was determined that additional studies with matched controls and more extensive premorbidity data were needed to confirm the findings.

Postdischarge services required and received by study children and their families for reintegration into the community were reviewed. A pattern of postdischarge rehabilitation services needed by children with specific traumatic brain injuries emerged; however, further study is needed for validation.

Various resources for professionals providing care for children with traumatic brain injury were developed.

Pediatric Emergency Medical Services Training Program
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EMSC
MCJ-113564
12/01/84–11/30/88
Project Director(s):
Martin R. Eichelberger, M.D.

PROBLEM: The 1990 Health Objectives for the Nation call for a reduction in mortality and morbidity caused by injuries. Injuries are the leading cause of death for children between 1 and 14 years of age. Major categories of injuries contributing to the mortality of children are motor vehicle passenger and pedestrian events, burns, falls, and drowning.

Responding to the special needs of children during an emergency is particularly challenging to prehospital emergency personnel. Not only do children have a smaller anatomy than adults, but their physiologic response to traumatic injury and acute illness also differs in many respects. Children will often receive different injuries than adults, even when involved in the same accident. In addition, they may not compensate as well as adults for the same injuries. For example, children may go into shock more quickly because they have a smaller blood volume. In some instances, children may compensate better than adults (as in the case of cold water drowning, because of the diving reflex).

Coupled with the physiologic responses of children to an illness or injury emergency are their emotional needs. A child usually responds to an emergency situation with fear. It is often difficult to communicate with the child because of his or her limited language skills. In addition, it is impossible to overlook the parents, who provide much of the child's medical history and represent security to the child in a critical event.

GOALS AND OBJECTIVES: The organization of emergency medical services (EMS), both prehospital and hospital, has been associated with a reduction in death and disability because of the opportunity to respond rapidly at the scene and stabilize an ill or injured patient. Training of emergency medical technicians (EMTs) and paramedics has focused predominantly on prehospital care for adults, because the majority of emergency calls involve adults. However, for those instances when the patient is a child, the EMT must be able to recognize potential life-threatening injuries and illness early and intervene appropriately.

METHODOLOGY: The U.S. Department of Transportation curriculum standards for the training of basic EMTs require 110 hours, with 3 hours devoted to childbirth and pediatric problems. Some States have chosen to add more total hours to basic EMT training, usually with some additional time given to pediatrics. Most newly trained EMTs are young, having little or no exposure to children and their expected behavior. Emergency specialists in pediatrics consider 3 hours to be inadequate training for EMTs to learn the appropriate response to childhood emergencies.

Children's Hospital National Medical Center began offering continuing education to EMTs and paramedics in 1982. Improved prehospital care for children has been observed. Rather than continuing to provide education only to local field providers, the pediatric emergency medical services training program (PEMSTP) was developed to address the pediatric deficiencies in the training of EMTs. Using a trainer of trainers model, EMT instructors, nominated by State EMS directors and selected by the project staff, are brought to Children's Hospital National Medical Center for 5 days of lectures, skills, and clinical experience in the special consideration and management of pediatric emergencies.

Upon completion of the program, these EMT instructor graduates are committed to return to their home State and teach pediatric prehospital care to field providers and/or other State EMT instructors. Each graduate

receives an instructor's manual with lecture outlines, suggested audiovisuals, and supplemental course materials. The graduates, in collaboration with their State EMS office, decide the best approach for dissemination of the pediatric emergency medical services training program material. Since the first class in January 1986, the instructor graduates have influenced their States to duplicate the program for their own instructors, to offer continuing education to EMTs, and to provide the content in recertification programs. Ultimately, as EMTs in the States and territories receive the training, it is anticipated that prehospital management of acute childhood illnesses and injuries will be improved.

EVALUATION: After 1 year of program development, the pediatric emergency medical services training program offered eight courses between January and November 1986. A total of 79 EMT instructors (representing 49 States, the District of Columbia, and 1 United States territory) have completed the program. More advanced course content has been added to keep the instructors challenged, without sacrificing the content believed most critical for EMTs. A followup survey and posttest have been sent to the first 40 participants to determine their retention of program information and their teaching activity over the past 6–9 months.

EXPERIENCE TO DATE: The EMS instructors who have attended the pediatric emergency medical services training program have been enthusiastic about the program, and have made significant efforts to provide pediatric prehospital training in their home States. A variety of EMT instructors (including training coordinators, full-time instructors, and part-time instructors, paid or voluntary) have attended the program; some are employed by their State, and others are paid by local fire departments.

At the present time, four States have committed to statewide pediatric EMS training. Most have elected to begin by training their EMT instructors, either duplicating the pediatric emergency medical services training program or modifying the course with a reduction in hours taught. In each of these States, clinical experience for EMT students in children's hospitals or other facilities has been arranged.

Other States are considering or are implementing instructor training based upon the pediatric emergency medical services training program, but not on a statewide level. Several EMT instructor graduates have already incorporated the content into the basic EMT courses they teach, even if the hours allotted to pediatrics have not increased. Other graduates are offering the course content in continuing education programs. The commitment by a State to offer pediatric training is related, in many cases, to the State's EMS organization structure, the level of EMS instructor attending the program, and the availability of State or private funding for such training.

Pediatric Emergency Medical Services
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MCHIP
MCJ-117025
10/01/90–07/31/93
Project Director(s):
Michael L. Millman, Ph.D.

PROBLEM: Many of the agents that cause childhood death and disability—such as motor vehicle crashes, unintentional injuries, immersion, burns, seizures, asthma, and epiglottitis—strike with great suddenness and require medical care on an emergency basis. In 1988, intentional and unintentional injuries were responsible for the deaths of more than 8,000 children ages 1–14, or approximately half of the deaths in that age group. Successful emergency treatment can help minimize both deaths and disability.

Historically, most emergency medical systems have been designed to deal with adults, not with children. Until recently, information on children's emergency care has been limited, and few studies have been done to evaluate those practices that are being followed. Efforts in the early 1980s by individual practitioners and professional societies helped focus attention on the need for specialized training programs and practice guidelines for pediatric emergency care. These efforts received a substantial boost in 1985 with the initiation of a Federal demonstration program for emergency medical services for children. The 20 projects that were funded between 1985 and 1990 have led to the development and dissemination of new training programs and approaches to organizing services. They also have generated data collection activities that should provide better resources for surveillance and evaluation of emergency care. Although the demonstration projects are valuable means of generating experience in improving pediatric emergency medical services, a broader and more comprehensive study being conducted by the Institute of Medicine will help fill the need for objective analysis of needs, potential benefits, and effectiveness of current program elements.

GOALS AND OBJECTIVES: The Institute of Medicine will assess the nature and extent of the problem of pediatric medical and trauma emergencies and their outcomes, describe the current state of services in providing effective care, address standards and data needs for surveillance and evaluation of services and outcomes, and recommend policy mechanisms to promote the development of better systems of care.

METHODOLOGY: This project is being carried out under the guidance of a 19-member committee of individuals with expertise in pediatrics, emergency medicine, trauma, nursing, prehospital emergency services, injury prevention, rehabilitation, hospital administration, public policy, and local government. Five members of the committee have participated in emergency medical services for children (EMSC) demonstration program activities.

Activities are undertaken as needed to support the committee's work, including site visits, workshops, and panel meetings. Five site visits will be conducted to study existing pediatric emergency services. It is anticipated that these visits will include a mix of urban and rural locations that have and have not participated in the emergency medical services for children demonstration grant program. Three panel meetings or workshops will examine specific topics in greater detail. Background papers may be commissioned for these meetings.

EVALUATION: Project progress will be monitored by the Institute of Medicine executive staff as well as by the study committee and staff. The status of each study is described and discussed at least monthly. After the study committee has completed the report, the report will be submitted for independent review under the procedures of the National Research Council (NRC). This normally involves a panel of six reviewers and a

review coordinator who evaluate whether the study committee has fulfilled its charge in a responsible and well-documented manner. Studies that involve recommendations to the Federal Government are specially noted. The review coordinator must communicate approval of the report to the NRC monitor, who confirms that the review requirements have been met.

EXPERIENCE TO DATE: Funding for the Institute of Medicine Pediatric Emergency Medical Services study was awarded in October 1990, but administrative and staffing constraints delayed the start of work on this project until March 1991. A study director has been named, and the 19-member committee has been assembled.

On June 18–19, 1991, the committee held the first of five planned meetings and began to define the scope of the report it will produce. These initial discussions resulted in an agreement to focus first on two topics: (1) Establishing the essential components of a system of emergency care for children in a way that can better identify where the system is failing children, and (2) defining information and information systems that will facilitate assessments of the quality of care and cost-effectiveness of resource allocations. A second meeting was scheduled for September 25–26, 1991.

About half of the committee members were able to attend the National Emergency Medical Services for Children Conference: Report to the Nation on June 19–21, 1991. The report prepared for the conference and the presentations and discussions during the conference serve as valuable background materials for the committee's work.

Emergency Medical Services Grant for Children
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EMSC
MCH-124001
10/01/87–06/30/91
Project Director(s):
Joseph J. Tepas, M.D.

This project evaluated emergency medical services for children by coordinating the clinical, research, and educational efforts of the three major components of pediatric emergency care: Pediatric critical care medicine, pediatric emergency medicine, and pediatric trauma care. This evaluation focused on death and/or disability as the ultimate final consequences of critical illness or injury in children, and evaluated the effects of shock, respiratory failure, and coma. The pediatric population requiring emergency care was defined by combining existing component data bases into a single system to record epidemiologic, demographic, socioeconomic, and physiologic characteristics of children presenting for emergency care in northeast Florida. Outcome was evaluated by accumulation of physiologic data from the prehospital, inpatient, and postdischarge stages of care and attempts to validate the applicability of various physiologic scoring assessment systems to address each of these stages. The educational efforts of each component were combined and augmented to refine and improve dissemination of pediatric prehospital care courses for physicians, nurses, and allied health professionals. Progress through the course of this study was evaluated by a panel of experts (including a pediatric intensivist, pediatric emergency physician, pediatric trauma surgeon, critical care nurse, and paramedic educator) who reviewed data collected at 6 and 12 months.

The project thereby achieved three goals:

1. It supported development of a comprehensive combined data base with information on all aspects of pediatric emergency care;
2. It provided assessment of physiologic and anatomic indices of measurement during prehospital, hospital, and postdischarge phases of care; and
3. By periodic review of objective evaluators, it documented the impact of these efforts on improved emergency medical care for children.

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EMSC
MCH-154001
10/01/87–09/30/91
Project Director(s):
Donna Maiava
Calvin Sia, M.D.

The State of Hawaii Department of Health, in cooperation with all agencies concerned with the health care of children, developed a comprehensive plan to reduce the consequences of critical illness and injury in the pediatric population. A vertically integrated emergency system was described that coordinated care from the first respondent through field stabilization, transport, emergency care, rehabilitation, and case management by the primary care provider.

A quality assurance system was developed to monitor all aspects of emergency medical services for children (EMSC) in the State of Hawaii. The system included data collection, case review, problem identification, and mechanisms for change at all levels of emergency care. An EMSC Committee was established to review and monitor the information collected. Representation on this committee assured that solutions to problems would be implemented through appropriate agencies. Changes were made through improvement of services, education at all levels, and legislative action.

Specific grant activities included curriculum development and formal educational programs for training first respondents, prehospital personnel, nursing staff, and physicians in the critical skills necessary for managing pediatric emergencies. Standards for equipment, drugs, and skills were developed for facilities providing emergency pediatric services.

All project activities were particularly sensitive to addressing the needs of the unique aspects of the population of Hawaii. These included the transient tourist and military populations, the varied immigrant groups, and the native Hawaiian residents. The role of the professional community of Hawaii in providing services and consultation to the entire Pacific Basin received special consideration. Activities addressed the needs of a resort and tourist community, and these activities may serve as a model for States with similar resort and tourist communities.

The following products were planned with grant support:

1. A quality assurance system for a vertically integrated EMSC program including data collection, problem identification, and cyclic feedback to all levels of emergency care, resulting in education, improved services, and legislation;
2. A competency-based curriculum for training nurses in pediatric emergency care;
3. Skills, drugs, and equipment standards for office practice pediatricians, freestanding (nonhospital-based) emergency centers, and ambulance care;
4. Epidemiological studies of critical illness and injury in Hawaii;
5. Identification of special needs related to disabling conditions;
6. A rehabilitation plan for the State;
7. Education and training for all levels of pediatric emergency care;
8. A preschool injury prevention program; and
9. A curriculum to develop an emergency medical system for Micronesia during the second year of the project.

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EMSC
MCH-164001
10/01/89–09/30/92
Project Director(s):
Paul Anderson

PROBLEM: Emergency medical services (EMS) across the United States face special challenges in providing effective emergency care to the pediatric population. Programs in rural areas report that low-volume patient contact makes it hard to maintain competency and that continuing education is unavailable or difficult to maintain. These problems are compounded for the pediatric age group, since less than 10 percent of total patient volume may be pediatric in nature.

GOALS AND OBJECTIVES: In an effort to remedy the potential deficiency in access to quality pediatric emergency care in rural areas, Idaho EMS applied for and was awarded an emergency medical services for children (EMSC) grant. The broad goals of the project are to reduce morbidity and mortality due to medical and traumatic emergencies in children treated by emergency care personnel. Upon completion of the grant, it is hoped that health care providers in Idaho will have a more complete understanding of the emergency care needs of infants and children. The following objectives were chosen for the project:

1. Implement, within 90 days of grant award, six regional EMSC committees to address systems development issues;
2. Conduct basic life support (BLS) EMSC training for 2,000 prehospital EMS personnel at essentially 100 percent of Idaho's EMS units during the 24-month project period;
3. Conduct advanced life support (ALS) EMSC training for 500 prehospital intermediate/advanced life support EMS personnel at essentially 100 percent of Idaho's intermediate/advanced EMS units during the 24-month project period;
4. Conduct EMSC training for 500 emergency nurses at essentially 100 percent of Idaho's hospitals during the 24-month project period;
5. Conduct EMSC training for physicians on the medical staffs of essentially 100 percent of Idaho's hospitals during the 24-month project period;
6. Implement an EMSC public education/prevention program in multiple pilot areas of Idaho during the 24-month project period;
7. Develop and implement a mobile pediatric interactive unit to deliver realistic simulation training to emergency care personnel with essentially 100 percent of the prehospital EMS units and hospitals in the State during the 24-month project period;
8. Correct, within 12 months, 100 percent of the rural hospital emergency department pediatric equipment deficiencies identified during the 1989 EMSC hospital survey;
9. Design and conduct an EMSC knowledge/skills retention study during the 24-month project period to determine the training frequency necessary to maintain critical knowledge and skills of emergency care personnel at acceptable levels;
10. Design and conduct a postincident family visit study during the 24-month project period to determine effectiveness of having emergency medical technicians (EMTs) and nurses perform such visits;
11. Reduce the anxiety and increase the comfort levels of prehospital and hospital emergency care personnel in Idaho in dealing with pediatric patients and their families; and

12. Implement EMSC training and public education/prevention programs for four Native American groups (Kootenai, Nez Perce, Owyhee, and Bannock-Shoshone tribes) in Idaho.

In addition, the following objectives related specifically to knowledge, transfer, and utilization have been outlined:

1. The Idaho project will demonstrate how a statewide EMSC project can be successfully planned and implemented in a State that does not have tertiary care centers and/or a university medical center;
2. The Idaho EMSC project will demonstrate effective use of the mobile training method to bring pediatric EMS training to prehospital and hospital providers in rural areas;
3. The use of the teleconference method of providing EMS educational sessions to EMS providers dispersed over a large geographical area will be shown to be a cost-effective approach that has considerable potential for use in other rural areas of the Nation;
4. The effective use of interactive laser videodisc methodology in simulating pediatric emergency situations for rural health care providers will be demonstrated; and
5. The results of the project studies will be widely disseminated to interested States that wish to implement similar programs.

METHODOLOGY: The Idaho EMSC project adapted the successful innovative programs of the California, Oregon, and Washington EMSC projects for the rural population in Idaho. An example of program adaptation is the reconstruction of the Washington State EMSC Pediatric Prehospital Care curriculum to work in a mobile training unit and teleconference presentation format.

In an effort to remedy the deficiency in accessing quality pediatric continuing education, a new approach has been developed using interactive videodisc technology.

Additional time and effort have been devoted to bringing quality pediatric education to Idaho for physicians and nurses throughout the State.

EVALUATION: Evaluation to assess the knowledge and abilities of emergency providers is accomplished via pretest and posttest methodologies. Data are collected by tracking system performance using the Optical Mark Reading system. In addition, select patient groups are being tracked from the emergency department through to discharge. We are also using questionnaires in select provider groups to analyze student perceptions of the effectiveness of the education program delivery.

The project is being tracked by timeline and contract completion guidelines. A computer-based program is being used to track all aspects, including dates, costs, and hours worked. This will provide forecasting, decision making, analysis, and evaluation.

EXPERIENCE TO DATE: We have completed our objectives concerning regional development and participation. Our educational objectives on a statewide basis have been completed for both prehospital providers and hospital staff. Educational programs have been targeted for Native American populations, and we have provided training in these areas. A statewide prevention program on bicycle safety has been implemented successfully. A hospital emergency department survey has been completed, and equipment has been provided to meet the needs of hospitals identified in the survey.

Implementation of the two research objectives required a longer time period, due to the difficulties and time spent finding qualified personnel to be involved in the studies. Progress has been achieved in both studies, and data collection and analysis have been scheduled for completion.

The Idaho EMSC project completed development and implementation of a mobile pediatric interactive videodisc training program. Our initial community visits generated a great deal of enthusiasm, and a second interactive videodisc program was planned. Knowledge, transfer, and utilization have involved use of the interactive videodisc concept. At this point, we have been very successful in providing information to adjacent States about implementation of EMSC programs.

Emergency Services for Children for Louisiana
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EMSC
MCH-224001
10/01/89–09/30/91
Project Director(s):
William D. Hardin, Jr., M.D.

PROBLEM: The quality of emergency medical services for children (EMSC) in Louisiana currently cannot ensure optimal and timely emergency care for all children with life-threatening illnesses or injuries in the State. Emergency medical services (EMS) personnel are inadequately trained in pediatric emergencies and lack the equipment necessary to initiate all but the most basic levels of pediatric life support. Emergency rooms are frequently ill equipped and poorly organized for the pediatric patient, while their respective institutions offer varying levels of subspecialty pediatric care. There is no regionalized system for pediatric care, and outcome is therefore a reflection of local EMS and hospital capabilities.

GOALS AND OBJECTIVES: The long-term goal of the Louisiana EMSC project was to reduce the morbidity and mortality due to pediatric emergencies by developing a statewide system for emergency pediatric care. This project incorporated features of previous EMSC grant recipients while offering new initiatives to expand upon previous efforts. Particular attention was focused on the emergency medical care needs of handicapped children and those who require chronic ventilatory assistance.

METHODOLOGY: Early initiatives in this project focused on areas that have traditionally been important to local/State EMSC development. These included establishing a replicable data base to guide future system development, initiating pediatric advanced life support training for EMS personnel, and assessing the current quality of EMSC care provided by EMS systems and hospitals in Louisiana. During the second project year, efforts continued in prehospital personnel education, data collection, and public education. Programs initiated in the first project year were strengthened and expanded. Intense effort was directed toward establishing long-term data acquisition and using the data to direct future legislative initiatives and systems change.

The Louisiana EMSC project was a cooperative venture sponsored by the Tulane University School of Medicine and the Children's Hospital of New Orleans. Tulane University School of Medicine coordinated the statewide project activities. Ongoing educational efforts were based at both Tulane and the Children's Hospital. To accomplish the long-term goals of the project, it was necessary to generate a community and statewide network among the myriad agencies and organizations concerned with the well-being of Louisiana's youth. After these contacts were in place, cooperative efforts were begun.

EXPERIENCE TO DATE: Project accomplishments included the following:

1. Education of paramedics/emergency medical technicians: One of the critical elements in improving emergency services for children in Louisiana was to upgrade the level of training and experience of prehospital personnel responsible for stabilizing and transporting the acutely ill or injured child. There were 12 advanced life support emergency medical services in the State, in addition to approximately 80 services which provided basic life support only. Efforts were concentrated on those advanced life support programs that covered the metropolitan regions of the State and provided services to the majority of the population. The premise behind these educational efforts was that field stabilization of the pediatric patient would improve outcome and provide greater options in triage of the pediatric patient.

At the start of the project, the guidelines for prehospital personnel dictated a "scoop and run" philosophy in which pediatric patients were rapidly transported to the closest emergency room without field stabilization or resuscitation. Intravascular access was not established and the airway was managed through bag-valve-mask ventilation. Continuing education in pediatric care was minimal and prehospital personnel were uncomfortable dealing with the pediatric patient.

To address these problems, prehospital personnel throughout the State were given the opportunity to take the Pediatric Advanced Life Support (PALS) course which emphasized the importance of identifying shock and respiratory failure before the onset of cardiopulmonary failure or arrest. Based on the initial physical examination, treatment priorities were established and stabilization was begun. As of FY 1991, 16 PALS courses had been conducted around the State, and 143 paramedics/emergency medical technicians had completed the program. Prehospital personnel reported an increased comfort level in dealing with the pediatric patient. Attempts were made to quantify the benefits of this educational effort. The Louisiana EMSC project recognized that PALS training was a small step forward in improving the quality of pediatric emergency medical services. The PALS program was a simulation which had to be supplemented with practical, supervised pediatric experience. To accomplish this, prehospital personnel who had completed the PALS program were offered the opportunity to participate in a pediatric internship at Children's Hospital in New Orleans. The internship provided rotations through the operating room (where intubation experience was gained), the emergency room, and the pediatric intensive care unit. As of FY 1991, 23 students had completed the internship.

2. Pediatric emergency data collection: One of the premises of the Louisiana EMSC project was that long-lasting improvements in the quality of pediatric EMS would require the collection of data specific to Louisiana. While there were national data that adequately described the role of pediatric emergencies in morbidity and mortality in the pediatric population, the stimulus to change on a statewide level required data specific to the State. The project put together a computer system to permit long-term data collection beyond the period of project funding. The system allowed data to be collected from EMS services and hospitals. Data could be submitted through modem access. Data sets were determined and commitments were obtained from four major emergency medical services to submit data on their pediatric runs. Collection efforts took place. In addition to collection of data from emergency medical services, hospitals were asked to survey their pediatric experience. Because of the personnel required to collect these data, collection was planned as a short-term survey. This provided a limited perspective on the hospital care of the emergency-related injured child and helped identify hospitals with the experience and desire to provide EMS for children.

   The Louisiana EMSC project collaborated with the State Bureau of Emergency Medical Services to review education and training standards, equipment standards, staffing issues, and access to pediatric emergency medical services. The Governor of Louisiana appointed a Task Force on Emergency Medical Services, and the Louisiana EMSC project was represented on that task force. In addition, the project was involved with the Orleans Parish Medical Society, the Jefferson Parish Medical Society, and the Metropolitan Hospital Council to review triage protocols for pediatric patients.

3. Public education: The Bureau of Emergency Medical Services in Louisiana has been severely limited by personnel and funding shortages. The Bureau has been funded entirely by Federal dollars, and the scope of its activities was limited to certification and licensing of prehospital providers and inspection of ambulances. The fiscal problems in the State preclude passage of major legislation to either expand the scope of the Bureau's activities or provide increases in funding. To effect change in the structure of emergency medical services in Louisiana, the public must become informed about the importance of emergency medical services and demand change. The public must also become involved by taking responsibility for child safety and preventing pediatric accidents and injuries.

   To address these issues, the project conducted a pediatric emergency symposium, directed at health care providers and the public, which consisted of pediatric emergency education programs. The symposium was held in conjunction with the national Year of the Child in Emergency Medical Services campaign and generated significant media exposure for the issue. One of the most successful components of the program was the pediatric cardiopulmonary resuscitation (CPR) competition held for nurses and paramedics. Two-person teams competed first in a written examination and then in a practical demonstration of pediatric resuscitation skills. The competition generated enthusiasm among health care professionals and provided a mechanism for publicizing the issue through media coverage.

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Pediatric basic life support training was also made available to the public and was enthusiastically received. More than 150 individuals were certified in pediatric basic life support at the symposium. Future expansion of the pediatric CPR competition was planned to include teams from other States.

Emergency Medical Services for Children
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EMSC
MCH-234001
10/1/87–09/30/91
Project Director(s):
Charles Danielson, M.D.

PROBLEM: The Maine Emergency Medical Services for Children (EMSC) project sought to reduce the impact of critical illness and injury by improving the delivery of emergency medical services to children. The strategy of building on the existing structure of the Maine emergency medical services (EMS) system was used to facilitate implementation and assure continuation. The Maine State Board of Emergency Medical Services, the State agency overseeing prehospital care, has a strong working relationship with emergency providers, and their Physician Advisory Board members are all emergency physicians, but linkages of comparable strength had not been established with pediatric providers. Preliminary work had shown that Maine had more than 3,200 licensed providers with almost 75 percent at the basic or ambulance attendant level and less than 5 percent at the paramedic level. Review of standard training, equipment, and treatment protocols found deficiencies in the area of pediatric care.

GOALS AND OBJECTIVES: The goal of this project was to create a system that could reduce the impact of head injuries, posttraumatic shock, and respiratory arrests associated with infectious illnesses among pediatric patients.

METHODOLOGY: The concept that children should be cared for by appropriately skilled providers with appropriate equipment and in appropriate settings was a guide for project methodology. The project developed and implemented modular pediatric emergency training programs statewide for both prehospital and hospital providers. Basic pediatric equipment standards were developed for prehospital and emergency departments and emergency department capacity and interhospital transfer practices were evaluated. Injury prevention activities in playground safety and bicycle helmet use were implemented.

EVALUATION: The project used the existing Maine EMS Management and Information Systems (MIS) to carry out the evaluation and demonstrate how this data base could be utilized for evaluation. An outcome evaluation using hospital discharge data showed no significant changes in head injuries, respiratory arrests, and posttraumatic shock. The limited morbidity information available restricted the appropriate diagnoses to a small number.

EXPERIENCE TO DATE: Program accomplishments include the following components:

1. Results: The programs emphasized stabilization and evaluation of critically injured children. Prehospital trainees demonstrated considerable improvement in field performance after training, with each trainee receiving quarterly feedback on their performance assessment after training. The initial objective of training 75 percent of prehospital providers was unrealistic. Approximately 25 percent of pediatric EMS emergency runs included EMSC trainees at the conclusion of data collection, due to competing education, variable capacity to coordinate programs in the regions, and a perception of the lack of need. Strategies to overcome these barriers included statewide televised programs on pediatric EMS issues, intensive central office support for initial programs, and more aggressive promotion. Since turnover among emergency medical technicians (EMTs) is approximately 30 percent per year in Maine, a modification of the basic EMT curriculum was developed to include core pediatric information.

Training programs adopted by Maine Emergency Medical Services should now result in greater coverage of pediatric issues in the basic and continuing training programs.

By the second year of hospital provider training, the program was in competition with the pediatric advanced life support (PALS) program. Since that program had a greater potential for long-term support and implementation through both the Maine American Hospital Association affiliate and the American Academy of Pediatrics, efforts were shifted to encourage that program, and more than 400 providers were trained in the PALS program.

Training was carried out for all squads serving Native American Reservations. In collaboration with the Maine Emergency Management Agency, two programs addressing the needs of persons with disabilities were televised statewide on the Maine EMS Interactive Television System.

2. Guidelines and standards: Basic pediatric equipment and prehospital treatment guidelines were developed for ambulances and emergency rooms. These were approved by the physician advisory committee.

3. Analyses: Special studies were provided to Maine EMS, including studies in prehospital pediatric head injury, interhospital transfer, and pediatric emergency department capacity. All studies found that serious pediatric emergencies are infrequent experiences for most providers, thus creating special challenges in a rural State. The prehospital head injury study found that, of all emergency transports for head injury in children in Maine in 1987, only 3 percent could be classified as severe. The heterogencity of emergency services was underscored by the interhospital transfer and pediatric emergency department capacity studies.

4. Knowledge, transfer, and utilization: Project staff gave presentations at conferences in the region and nationally. Maine worked with Vermont and the New England Council for Emergency Medical Services to produce a conference on EMSC training in Hanover, New Hampshire, in March 1990. Papers are being prepared on prehospital head injury and performance impact of training.

5. Recommendations: An ongoing program to continue training and to modify treatment protocols and equipment guidelines is essential. Prehospital care is well organized in Maine and project activities have been adopted by Maine Emergency Medical Services. There is no leader for hospital activities, and discussions have been held with the Division of Maternal and Child Health about a program of pediatric quality assurance in Maine's hospitals. Professional organizations have been asked to include pediatric emergency education as an ongoing priority. Injury prevention programs will target local EMS for planning and carrying out interventions.

Organization for Comprehensive Emergency Medical Services for Children in Maryland
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EMSC
MCH-244001
10/01/87–09/30/91
Project Director(s):
James Flynn, M.D.

This project expanded and constructed a system of emergency medical services for children (EMSC) with life-threatening illnesses and injuries in the State of Maryland. These efforts represented an extension of the statewide pediatric trauma system which had been operational for more than 15 years and integrated other regional pediatric critical care activities. In addition, attention was focused on the organization and improvement of existing emergency medical services for pediatric critical illness. This pediatric critical illness supplement was a natural evolution of our experience with pediatric trauma, neonatal transport, and pediatric burns, all of which were ongoing components of the Maryland Institute for Emergency Medical Services Systems (MIEMSS).

The demonstration included four projects. Project 1 studied the epidemiology and demographics of trauma and critical illnesses in Maryland children to quantify incidence, regional distribution, and existing outcome as measured by mortality, hospital stay, discharge disposition, and short-term followup. These data were used for planning for the specific emergency pediatric needs of the State's five designated regions and for targeting future interventions to improve outcome, with special attention to handicapped and minority children (including Native American children). Project 2 developed standards for patient triage within our pediatric echelons of care, examined current systems for identifying severity of illness and injury, and evaluated the applicability of these systems to acute illnesses and injuries in children. Project 3 refined and placed in modular format our current advanced pediatric life support (APLS) educational materials, with the goal of targeting educational interventions. These course materials were adapted for primary physicians, nurses, and paramedics within the EMSC system. These three projects were developed simultaneously with project 4, which facilitated application of this new knowledge within our current system.

In summary, projects 1, 2, and 3 focused on the development of new knowledge and data on EMSC, and project 4 addressed the parallel implementation of this knowledge and information to supplement our current system, including the organization of regional pediatric councils to facilitate designation and triage.

Improvement of Emergency Medical Services for Children Demonstration Program

State of New York Department of Health
Emergency Medical Services
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EMSC
MCH-364001
02/01/86–01/31/89
Project Director(s):
Robert J. Huszar, M.D.

PROBLEM: A comprehensive program was designed to address all areas of emergency medical services for children (EMSC) in both urban and rural areas of New York State. Three target regions encompassing over 53 percent of the State's population (more than 9 million persons) were selected as demonstration sites for the development and testing of various program modules. These areas (Albany region, New York City, and Rochester region) were chosen for their location, population mix, distribution of urban and rural areas, expertise of program staff, and willingness to devote significant amounts of time to the program areas covered by the project.

GOALS AND OBJECTIVES: Project goals and objectives focus on the following program areas:

1. Categorization of hospitals: Standards will be developed for categorizing both urban and rural hospitals as receiving centers for the care of critically ill pediatric patients in all three regions. After the hospitals have been categorized, the designation process will be initiated.
2. EMSC training programs for emergency medical services (EMS) personnel: Training modules in pediatric emergency care for both basic and advanced emergency medical technicians (EMTs) such as paramedics will be developed in all three regions. These will be used to train at least one-third of the EMS personnel in the demonstration sites during the grant period. Evaluation of the outcome of certain traumatic and medical pediatric conditions will be performed before and after the training to determine its effectiveness.
3. EMSC ambulance equipment: The ambulance equipment needed for EMTs and advanced EMTs to manage critically ill pediatric patients will be determined in all three regions. Some of the needed equipment will be purchased using grant funds.
4. EMSC triage protocols: Management guidelines will be developed and implemented for children admitted to the emergency department presenting with cardiac arrest, respiratory emergencies, or multiple injuries in one region. Emergency department personnel will be trained in the management of such pediatric patients, and a pediatric emergency registry will be implemented. An evaluation of the efficacy of the guidelines and the training of the emergency department personnel will be performed.
5. EMSC treatment protocols: Pediatric treatment protocols will be developed and implemented in all three regions. The effectiveness of the pediatric treatment protocols in reducing pediatric morbidity and mortality will be determined.
6. EMSC training of emergency department personnel: A training program for managing pediatric emergencies admitted to the emergency department will be developed in all three regions. All emergency department personnel will be trained. The program's effectiveness in reducing morbidity and mortality will be determined.
7. Parent and caregiver training program: A parent/caregiver training program will be developed and presented to child care center workers and certain parent groups in two regions. The effectiveness of this program will be evaluated through telephone interviews and questionnaires.
8. Pediatric emergency hotline program: A pediatric emergency hotline for use by physicians, nurses, and other medical personnel, including a manual containing instructions on how to manage particular

emergencies by telephone, will be developed in one region. An evaluation of the hotline system will be performed.

9. Pediatric transport system: A pediatric transport system will be developed (in one region) to transfer stabilized pediatric patients great distances (from outlying hospitals to a specialty pediatric care center) with the benefit of adequate monitoring and life support. The system will be evaluated by comparing its transport outcomes with those of alternative forms of pediatric transport.

All program activities will be under the supervision of the Medical Director of the Emergency Services Development Program of the New York State Department of Health, assisted by the State Emergency Medical Services and an advisory council consisting of EMS representatives from all regions of the State.

EVALUATION: The programs are designed to produce fully tested and easily implemented training modules or guidelines and pediatric treatment and triage protocols to be used in any area of New York State, or in any State, with little or no revisions. The potential for replication of this demonstration project is therefore unlimited; the programs are very significant for the improvement of emergency medical services for children.

Emergency Medical Services for Children in Oregon
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EMSC
MCH-414001
02/01/86–05/31/89
Project Director(s):
Toni Bachulis, R.N., M.S.

PROBLEM: Although Oregon is progressing in regionalization of perinatal care and adult trauma care, the special needs of children in emergency medical situations have not been addressed. The existing research findings of major urban centers for standards and training must be tailored to our dispersed population.

GOALS AND OBJECTIVES: This goal of this project is to develop a regionalized, comprehensive emergency medical services (EMS) system for children in Oregon. The objectives of this project are to develop:

1. A methodology for developing and refining criteria for levels of pediatric critical care on a statewide basis;
2. Criteria for three levels of pediatric critical care facilities which have been demonstrated to be appropriate for respiratory failure and head injury;
3. A demonstration that statewide regionalization of pediatric care improves outcome for patients with respiratory failure and head injury in a rural area;
4. Materials for EMS field providers to use to educate adults in their communities about when and how to access the emergency medical services system for ill and injured children, and what to do until help arrives;
5. Prehospital and hospital algorithms for the treatment of head injuries which have been evaluated using objective data and which are appropriate when tertiary care must be delayed;
6. A paramedic pediatric curriculum and test which can be incorporated in the initial certification exam, and a basic pediatric curriculum which can be offered at low cost to rural emergency medical technicians by training trainers to conduct continuing education classes;
7. Videotapes for rural physicians on management of head injury to encourage proper treatment and transfer of pediatric head injuries in the field, when appropriate;
8. An evaluation of the effectiveness of transcutaneous PO_2 and PCO_2 monitoring in the field for pediatric head injuries;
9. A modular curriculum to train lay child care providers who give respite care for parents whose children have been discharged home but who have exceptional needs for specialized care; and
10. A rehabilitation evaluation protocol for pediatric patients who are discharged from acute care facilities.

These products are either not available currently or have not been tailored to the needs of rural States.

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EMSC
MCH-504001
10/01/89–09/30/92
Project Director(s):
Patrick Malone

PROBLEM: Vermont is a rural State with a population of 550,000, including 139,000 children under 18 years of age. Emergency medical services (EMS) are provided by 140 licensed ambulance and first responder services, primarily small volunteer organizations. Fifteen hospitals operate emergency departments. Leading causes of death from 1980 to 1989 for children in Vermont parallel the experience of many other States: Motor vehicle injuries accounted for 36.2 percent of childhood deaths; other unintentional injuries, 19.6 percent; suicide, 9.3 percent; homicide, 3.4 percent; various diseases, 29.1 percent; and other causes, 2.3 percent.

GOALS AND OBJECTIVES: The goal of the Vermont Emergency Medical Services for Children (EMSC) Project is to increase the capacity of the EMS system to deliver pediatric emergency care.

Objectives for the project period include:

1. Complete the implementation of a pediatric emergency registry;
2. Continue implementation of a standardized run report system;
3. Continue delivery of prehospital training courses;
4. Continue expansion of pediatric advanced life support (PALS) training for physicians, nurses, and paramedics in the State;
5. Implement the pediatric emergency nursing curriculum for nurses throughout northern New England;
6. Produce an interactive videodisc on pediatric trauma, with the Idaho EMSC program;
7. Complete statewide and neighboring State implementation of the Mediquiz and Pediatric Respiratory Emergencies interactive videodiscs;
8. Continue to support the involvement of prehospital providers in locally based injury prevention initiatives;
9. Complete the evaluation of previously implemented prevention programs; and
10. Support the Vermont Child Safety Coalition's ongoing efforts to plan for long-term EMSC goals and to develop strategies to meet identified needs.

METHODOLOGY: Minimum data sets have been established for the pediatric emergency registry. Scannable forms will be used in hospital emergency departments to gather information on pediatric patients. Output reports will be provided to each hospital, and aggregate information will be available to the State. A standardized statewide run report form is being updated, and a standard data set will be entered into a computer. Output reports will serve a variety of users.

Ongoing traditional education and training activities statewide will enable the project to meet target percentages of EMS providers. Squad inservice training and a 1-day basic life support prehospital course are the primary delivery mechanisms.

Two interactive videodiscs (Mediquiz and Pediatric Respiratory Emergencies) will continue to be circulated throughout Vermont hospitals, affording a highly standardized and cost-effective means of delivering state-of-the-art training to all levels of EMS providers. A third interactive videodisc on pediatric trauma will be jointly developed in conjunction with the Idaho EMSC project.

Nurses, physicians, and paramedics will continue to have improved access to PALS training through expanded offerings at multiple sites in the State. An initial offering of the new pediatric emergency nursing curriculum will take place for nursing instructors in Vermont, New Hampshire, and Maine.

Project staff will support local injury prevention initiatives with technical assistance and printed materials for EMS agencies. Evaluation of previously implemented community-based prevention programs will be completed. The project plans to contract with the Vermont Child Safety Coalition for delivery of EMSC training programs this year to help ensure the viability of this group beyond the project period. This broad-based group is beginning to identify long-term EMSC goals and strategies for change.

EVALUATION: Effectiveness of project activities will be measured by several different mechanisms. Establishing the pediatric emergency registry and the prehospital run report system during this project year will be process measures for the data surveillance objectives. Pretests and posttests are being administered to participants of EMSC courses in Vermont. We are tracking the percentage of physicians, nurses, and prehospital providers who have participated in EMSC training.

We are also tracking the number of injury prevention initiatives. Several community-based prevention initiatives supported in previous years of the project had specific outcome measures built into the program design.

Emergency Medical Services for Children
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EMSC
MCH-534001
10/01/87–09/30/91
Project Director(s):
Dena Brownstein, M.D.

PROBLEM: The needs of the injured and critically ill child are not adequately met by the existing emergency medical services (EMS) system in Washington State. In a survey of EMS units in Washington, it was clear that little field intervention was undertaken for the youngest and most seriously ill children. The same survey found that an overwhelming majority of prehospital care providers surveyed felt a need for additional training in pediatrics. The statewide survey also revealed that only 24 percent of EMS providers could identify a pediatric consultant. Lack of a statewide system for data management and lack of linked outcome data impede efforts to identify and target problem areas. Minority populations are at risk for excess morbidity and mortality as a result of delayed or inappropriate pediatric EMS utilization. While the State maintains standards for receiving hospitals under EMS, there are no specific pediatric standards, and there is no system for triaging children according to severity of illness, degree of injury, and qualifications of the receiving hospital.

GOALS AND OBJECTIVES: The goals of the project were to: (1) Eliminate excess morbidity and mortality in pediatric emergencies resulting from inadequate knowledge, equipment, and support of prehospital care providers and hospital-based medical personnel; and (2) eliminate excess morbidity and mortality among minority children due to cultural, language, and economic barriers to emergency care. The objective of this project was to address the technical information needs of prehospital and emergency room providers, focusing on trauma, seizures, and drowning.

METHODOLOGY: Twenty-five percent of prehospital care providers in Washington State received training, and an ongoing system for training was established. A set of field guidelines and algorithms for pediatric basic and advanced life support was developed. A pediatric course for emergency room physicians was conducted. It focused on recognition of serious and life-threatening pediatric emergency conditions and their initial management and stabilization in the emergency room. The project developed a system to designate hospitals which meet objective standards of care as pediatric emergency and critical care centers. Additionally, uniform criteria for secondary transport were implemented throughout the State. The project established a pediatric data base. Pediatric data, collected on existing EMS forms, were linked with mortality data and hospital discharge summary data. The purpose of the data base was to: (1) Monitor pediatric EMS care in the State to identify regions, diseases, or other factors with poor outcome; (2) provide the basis for conducting research into pediatric EMS care in the State, and allow for more indepth epidemiologic studies; and (3) evaluate the success of the pediatric EMS interventions implemented under this grant. To assess the issue of underutilization of emergency medical services by minority groups, a survey was conducted on utilization of EMS by Native Americans, migrant workers, and Southeast Asian refugees in order to identify specific barriers. A report of the findings and recommendations was planned. To facilitate patient followup after discharge, a pilot project to establish a referral system between the hospital and local public health nurses was conducted. To facilitate adaptation, utilization, and implementation of components of the Washington State project, the States of Alaska, Montana, and Idaho (the WAMI region) were involved from

the inception of the project. Detailed information on those components of the project of interest to each of the WAMI States were provided throughout the project period, and consultation was provided to the States upon request. Quarterly conference calls were conducted for mutual problem solving and sharing. The steering committee, with wide representation from the medical community, State and local EMS systems, and community agencies, provided oversight for the overall operation of the project.

Improving Emergency Services for Children in Wisconsin

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EMSC
MCH-554001
10/01/87–09/30/91
Project Director(s):
Gerri Britton

PROBLEM: Each year, unintentional injuries and emergency illnesses among Wisconsin's population of children under 18 years of age cause more than 500 deaths and thousands of hospitalizations. Injuries are the leading cause of death and disability among children. Appropriate and timely intervention through the stages of prevention, prehospital care, hospitalization, and rehabilitation have been shown to prevent deaths and reduce the severity of disability resulting from pediatric emergencies.

GOALS AND OBJECTIVES: In 1987, Wisconsin was awarded a 3-year Federal grant. The purpose of this initiative was to:

1. Expand and improve State and local capabilities for reducing pediatric emergencies and their consequences in the State;
2. Generate financial support from local and private sources for continuation of the programs after Federal support terminates; and
3. Foster in other States the capability to reduce pediatric emergencies and their consequences.

The overall goal of the project was to develop a plan for improving emergency medical services (EMS) for pediatric emergencies. The plan was designed to reduce pediatric death and disability from injury and sudden critical illness in Wisconsin by a minimum of 10 percent within a 5-year period and to increase both awareness and capabilities of providers, parents, and the public for emergency care of Wisconsin's children.

The following project objectives were established:

1. Hire project staff and continue the meetings of the Wisconsin Emergency Medical Services For Children Task Force;
2. Complete collection of baseline data and conduct a needs assessment (including identification of consequences, determinants, and contributing factors) of the Wisconsin EMS system as it pertains to pediatric patients;
3. Improve the availability of emergency medical services for children (EMSC), including Native American children, in rural areas of Wisconsin; and
4. Improve the appropriateness of emergency medical services for children in rural areas of Wisconsin.

METHODOLOGY: This award was preceded by the creation of the Wisconsin Emergency Medical Services for Children Task Force, which guided the grant application development and continued to guide every facet of the project. The creation of this task force assured that attention was focused on the needs of the pediatric patient, that activities were coordinated with all interested and necessary parties, and that activities would continue after the project ended.

The task force included the following committees: Assessment and Treatment Guidelines, Communications and Equipment, Data Development and Evaluation, Native American Programs, Public Information and Education, Special Needs, and Training Development. This task force and its seven working committees brought together agencies, associations, and individuals involved in pediatric and emergency care and treatment.

The 28-member body included all chairpersons of the working subcommittees. The organizational structure of the task force (and its support staff) consists of the following groups: Center for Health Systems Research and Analysis, the University of Wisconsin; Elert and Associates, Communications Specialists; Knopp and Watson Advertising Agency; WHA Radio/TV, University of Wisconsin; WISCOMP; Wisconsin Indian Network for Genetic Services (WINGS); and Wisconsin Farm Bureau Federation. (Consultants assisted and augmented the expertise of the task force and project staff.)

Project methodology focused on target populations through activities designed to:

1. Focus all project areas (data development, training, public information, and education) on the needs of three specific populations: Rural children, Native American children, and children with special needs;
2. Expand CHILD ALERT 10-33, a prehospital emergency program for children with special needs, to more than 100 ambulance services; and
3. Survey all Native American tribes, identifying the number and location of children on reservations, together with EMS activities and capabilities.

Project staff consisted of four full-time positions funded for 2 years of the project period and an intern position funded for 1 year. Positions were housed in the Emergency Medical Services Section, Bureau of Environmental Health, Wisconsin State Division of Health. These positions included project director/coordinator, nurse coordinator, public information and education coordinator, training coordinator, and program assistant.

The project also collaborated closely with other State government agencies with an interest in emergency medical services, including the Department of Public Instruction; Department of Transportation; Lieutenant Governor's Childhood Trauma and Injury Prevention Task Force; Wisconsin Board of Vocational, Technical and Adult Education; and Wisconsin Comprehensive Childhood Injury Prevention Unit, Bureau of Community Health and Prevention.

EXPERIENCE TO DATE: Since its inception, the Wisconsin EMSC Project (the task force supported by project staff) has geared its activities toward achieving stated goals and objectives. Project accomplishments/products have pertained to one of two project components: Data development, or public information and education.

The project achieved the following objectives in data development:

1. Analyzed existing data sources on pediatric emergency medical services in Wisconsin with special attention to three targeted populations: Rural, Native American, and children with special medical needs. Development of a classification system for analysis of pediatric death certificates and of hospital discharge data. Assessment of the accessibility and quality of data in ambulance run reports. Case review of the quality of care in pediatric emergencies and of strategies for injury prevention.
2. Analyzed the nature and incidence of pediatric emergency deaths in Wisconsin over a 3-year period, and hospitalizations over a 1-year period.
3. Developed, published, and distributed assessment and treatment guidelines for acute pediatric illness and injury cases for use by basic level emergency medical technicians (EMTs) for inservice training and field use.
4. Developed, published, and distributed advanced life support (ALS) assessment and treatment guidelines.
5. Developed a plan to expand the State EMS communications system, enhancing the availability of online medical direction.
6. Published and distributed ambulance equipment recommendations for basic and advanced level ambulance services.
7. Developed a 16-hour pediatric emergency care course for the basic life support prehospital care provider.
8. Conducted three instructor training courses on pediatric emergency care for 68 instructors, including representatives from Iowa, Minnesota, and the Wisconsin Native American community.

9. Helped to establish a network of nine hospital training centers throughout the State.
10. Collaborated with the National EMSC Project and the Wisconsin Emergency Nurses Association in developing a pediatric course for emergency department nurses.

The project achieved the following objectives in public information and education:

1. Designed and produced a logo, project brochure, and display board that provide information on the project;
2. Expanded FIRST CARE, a farm safety program through a contract with the Wisconsin Farm Bureau Federation;
3. Developed, published, and distributed EMS access telephone cards and a pediatric poster depicting responses to choking;
4. Developed a rural media campaign;
5. Conducted EMT conferences on public information and education; and
6. Coordinated a Midwest Regional Pediatric EMS Conference (fall 1990).